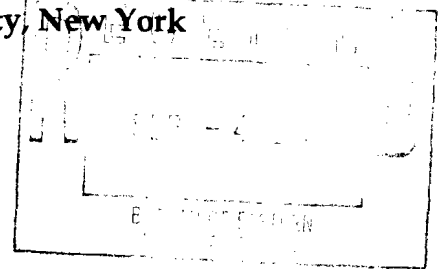


**SITE CHARACTERIZATION REPORT
OPERABLE UNIT 4 PHASE 3 OFF-SITE VAPOR INTRUSION EVALUATION
New Cassel Industrial Area
(Site No. 1-30-043-A, B, C, F, K, N and V)
North Hempstead and Westbury, Nassau County, New York**

Prepared for



New York State Department of Environmental Conservation
Investigation and Design Engineering Services
Standby Contract No. D004437
Work Assignment No. D004437-31

Prepared by

Camp Dresser & McKee Inc.
Raritan Plaza I, Raritan Center
Edison, New Jersey

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Contents

Section 1 Introduction	1-1
1.1 Site Description and Background.....	1-2
1.1.1 Location.....	1-2
1.1.2 Operational and Remedial History	1-2
1.1.2.1 New Cassel Industrial Area	1-3
Site A - 570 Main Street.....	1-3
Site B - 567 Main Street	1-4
Site C - 125 State Street.....	1-4
Site F - 68 Kinkel Street	1-5
Site K - 62 Kinkel Street.....	1-5
Site N - 750 Summa Avenue	1-5
Site V - 29 New York Avenue	1-5
1.1.2.2 Lawler, Matusky, and Skelly Engineers LLP 2000 RI/FS	1-6
1.1.2.3 NYSDEC October 2003 Record of Decision	1-7
1.1.2.4 O'Brien and Gere's OU 4 Phase 1 and 2 Off-site Vapor Intrusion Investigation.....	1-7
Phase 1 Investigation	1-7
Phase 2 Investigation	1-8
1.1.2.5 CDM 2008 Soil Vapor Intrusion Investigation	1-9
1.2 Site Geology and Hydrogeology	1-9
1.3 Project Objectives.....	1-9
Section 2 Physical Setting.....	2-1
2.1 Regional Geology.....	2-1
2.1.1 Basement	2-1
2.1.2 Cretaceous.....	2-1
2.1.3 Cenozoic-Quaternary	2-2
2.2 Regional Hydrogeology.....	2-2
2.2.1 Bedrock.....	2-3
2.2.2 Lloyd Aquifer	2-3
2.2.3 Raritan Clay	2-3
2.2.4 North Shore Aquifer.....	2-3
2.2.5 North Shore Confining Unit.....	2-4
2.2.6 Upper Glacial Aquifer (UGA)	2-4
2.3 Site-Specific Geology and Hydrogeology	2-4
Section 3 Site Investigation.....	Error! Bookmark not defined.
3.1 Vapor Intrusion Investigation.....	3-1
3.1.1 Sub-slab Vapor Sample Collection	3-2
3.1.2 Indoor (Basement) Air Sample Collection	3-2
3.1.3 Outdoor (Ambient) Air Sample Collection	3-3
3.1.4 Investigative Derived Waste	3-3
3.1.5 Sample Location.....	3-3

3.2 Sample Identification, Laboratory Analysis and Validation	3-3
3.3 Field Documentation and Reporting	3-3
Section 4 Analytical Results.....	4-1
4.1 Vapor Intrusion Results.....	4-1
4.1 Sub-slab and Indoor Air Investigation	4-2
Section 5 Conclusions and Recommendations	5-1
5.1 Conclusions	5-1
5.2 Recommendations	5-2

List of Tables

2-1	Soil Vapor Sampling Parameters
4-1	NYSDOH Air Guidelines
4-2	Soil Vapor/Indoor Air Matrix 1
4-3	Soil Vapor/Indoor Air Matrix 2

List of Figures

1-1	Sample Location Map
2-1	Generalized North-South Cross Section through Nassau County
2-2	Generalized Regional Stratigraphy
3-1	Soil Vapor Chlorinated VOC Detections

List of Appendices

Appendix A	Letter for Unscheduled Resident
Appendix B	Field Investigation Photolog
Appendix C	NYSDOH Indoor Air Sampling Questionnaire
Appendix D	Field Investigation Logbook
Appendix E	Analytical Results Summary Tables
Appendix F	NYSDEC October 2003 ROD, In-Well Vapor Stripping Process Figure

Acronyms

AS	air sparging
ASP	Analytical Services Protocol
bgs	below ground surface
CDM	Camp Dresser & McKee Inc.
Co	Company
CPP	Citizen Participation Plan
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
EPA	United States Environmental Protection Agency
FS	Feasibility Study
GAC	granulated active carbon
GPS	global positioning unit
HASP	Health and Safety Plan
IMC	IMC Magnetism Inc.
Inc.	Incorporated
IRM	Interim Remedial Measure
NCDOH	Nassau County Department of Health
NCIA	New Cassel Industrial Area
NY	New York
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PCE	Tetrachloroethene
PID	photoionization detector
PSA	preliminary site assessment
QAPP	quality assurance project plan
RI	Remedial Investigation
ROD	Record of Decision
SIM	selected ion monitoring
SVE	soil vapor extraction
TCA	trichloroethane
TCE	trichloroethene
µg/L	microgram per Liter
µg/m ³	micrograms per cubic meters
UGA	upper glacial aquifer
VOC	volatile organic compound
WA	work assignment
WC	W.T. Clark High School

Section 1

Introduction

This Site Characterization Report for the New Cassel Industrial Area (NCIA) Operable Unit (OU) 4, Phase 3 Off-site Vapor Intrusion Evaluation was prepared by Camp Dresser & McKee Inc. (CDM) for the New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design, Standby Contract No. D004437, Work Assignment (WA) No. 31. This report details the results of the field investigation conducted in accordance with the NYSDEC-approved Final Work Plan dated October 30, 2008. The Work Plan was developed in accordance with the *"Standby Contract Work Assignment No. D004437-31, Soil Vapor Intrusion Investigation at the New Cassel Industrial Area Sites (Site No.:1-30-043A, B, C, F, K, N and V)"*.

The objective of this WA is to determine if VOCs are present in the sub-slab vapor and indoor air at several residences, the Town of Hempstead Water Department Facility, and the W.T. Clarke High School. The vapor intrusion investigation is designed to determine if vapor intrusion poses a potential threat to human health and the environment at the selected locations.

The Work Plan and this Site Characterization Report are consistent with the *"Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006"* and the *"Draft Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated December 2002"*.

This report is comprised of the following sections:

- **Section 1 – Introduction**

This section presents the site description and history, including the location, operational and remedial history, geology and hydrogeology, as well as the project objectives.

- **Section 2 – Site Investigation**

This section provides a general overview of the investigation procedures and any variations to the approved Quality Assurance Project Plan (QAPP). These variations are noted for their potential to influence analytical results or field measurements.

- **Section 3 – Analytical Results**

This section presents and evaluates the analytical results of the vapor intrusion investigation conducted at the site. Results have been compared to the applicable New York State environmental standards.

- **Section 4 –Conclusions and Recommendations**

This section presents the conclusions based upon the analytical results of the site investigation and presents recommendations for potential future work.

1.1 Site Description and Background

1.1.1 Location

NCIA is located in the town of North Hempstead, Nassau County, New York (NY) (Figure 1-1). NCIA is heavily developed and covers approximately 170 acres which are bound by the Long Island Railroad to the north, Frost Street to the east, Old Country Road to the south, and Grand Boulevard to the southwest. NCIA and the surrounding areas, in general, are comprised of several light industrial and commercial properties intermixed with private residences located to the north and south. Hempstead Bay is located approximately 6 miles southwest of the site and the nearest water supply well, the Bowling Green Well Field, is approximately 1,800 feet southeast of the NCIA.

The 16 residential properties, Town of Hempstead Water Department Facility, and the W.T. Clarke High School designated for vapor intrusion sampling are located in the neighboring town of Westbury, NY. The area surrounding these 18 locations is a mix of commercial and residential properties.

1.1.2 Operational and Remedial History

Documents describing existing conditions, history and past land use practices were provided to CDM by NYSDEC. The information in these documents was used to provide a general description of the sites and historical/remedial activities conducted. The following NYSDEC provided background documents were utilized:

- OU 4 Phase 1 and 2 Vapor Intrusion Investigation, 2007. Work Assignment #D00490-40, New Cassel, Site No. 1-30-043A-V. O'Brien and Gere.
- Work Plan, 2006. New Cassel Operable Unit 4, Site No.1-30-043A-V, Vapor Intrusion Investigation, Work Assignment #D00490-40.
- Record of Decision, 2003. New Cassel Industrial Area Site, Town of North Hempstead, Nassau County, New York, Offsite Groundwater South of the New Cassel Industrial Area Operable Unit No. 3.
- Record of Decision, 2002. Tishcon Corporation at 29 New York Avenue Site, Town of North Hempstead, Nassau County, New York, Site Number 1-30-043V.
- Record of Decision, 2000. Atlas Graphics Site, Town of North Hempstead, Nassau County, Site Number 1-30-043B Operable Unit-01 On-Site Soil and Groundwater.
- Record of Decision, 2000. IMC Magnetics Site, Town of North Hempstead, Nassau County, Site Number 1-30-043A Operable Unit-02 On-Site Groundwater.

- Remedial Investigation/Feasibility Study Report, Volume 1, 2000. New Cassel Industrial Area Offsite Groundwater, Town of North Hempstead, Nassau County.
- Record of Decision, 1998. Tishcon Corporation Site at 125 State Street, Westbury (V), North Hempstead (T) New Cassel Industrial Area, Nassau County, New York, Site Number 1-30-043C.
- Record of Decision, 1997. Former Tishcon Corporation Site, Westbury, North Hempstead, New Cassel Industrial Area, Nassau County, New York, Site Number 1-30-043F.
- Multisite Preliminary Site Assessment (PSA) Report, 1996. New Cassel Industrial Area Site, North Hempstead, Nassau County.
- Environmental Investigation, 750 Summa Avenue Westbury, New York. 1996.
- Summary Report on New Cassel Industrial Area, Site ID#130043, 1995.

The following subsections describe the NCIA as well as the surrounding residential and commercial area, and provide a brief overview of operational and remedial activities conducted.

1.1.2.1 New Cassel Industrial Area

The NCIA was first developed during the early 1950s and is home to approximately 200 industrial and commercial businesses. Business practices associated with past light industrial activities within the area have resulted in extensive volatile organic compound (VOC) contamination of groundwater in the vicinity of the site. Previous investigations conducted within the area indicated that multiple parties were responsible for the contamination resulting in individual "sites." To address this, NYSDEC classified the entire industrial area as a hazardous waste site in 1998 and it is collectively referred to as the NCIA (LM&S 1996; NYSDEC 2003).

The following paragraphs summarize the operational and remedial history of NCIA's Sites A, B, C, F, K, N, and V, shown on Figure 1-1. Several of the sites have been classified in the past as either Class 2 or Class 4 status by NYSDEC. A site is classified under Class 2 status when hazardous waste presents a significant threat to public health and/or the environment and action is required. A site is classified under Class 4 status when it has been properly closed but requires continued site management, consisting of operation and maintenance, and monitoring.

Site A - 570 Main Street

Site A is located at 570 Main Street and is approximately over two acres in size. From the early 1950s until 1992, the site was occupied by IMC Magnetics Inc (IMC), a manufacturer of induction motors, fans, blowers, stepper motors and other rotating machinery. In 1995 the site was given a Class 2 Registry status by NYSDEC due to the presence of onsite contaminated soils and groundwater. Primary contaminants

consisted of chlorinated hydrocarbons, petroleum hydrocarbons and metals; however, further investigations revealed the presence of chlorinated VOCs. Subsequently, to remediate site soil contamination identified during a 1996 Remedial Investigation (RI), IMC installed and operated a soil vapor extraction (SVE) system. In addition, an RI/Feasibility Study (FS) conducted at the site confirmed the presence of a chlorinated VOC groundwater plume. To address the groundwater contamination, in-situ oxidation using hydrogen peroxide injection was selected as the remedy. Treatment began in December 2001 and was still ongoing upon completion of the October 2003, Record of Decision (ROD) for OU 3 (NYSDEC 2003).

Site B - 567 Main Street

Site B is located at 567 Main Street and is approximately one acre in size. In 1950 a warehouse was constructed onsite for use as a construction vehicle storage facility. Warehouse operations ceased in 1977, and the property was sold to Atlas Graphics Inc., a photo engraving manufacturing operation. The operation used a reported 312 gallons per year of trichloroethene (TCE). At the time of purchase, the building was connected to a cesspool for its sanitary waste disposal. In 1977, a discharge of approximately 50 gallons of TCE to the cesspool was documented. Investigations conducted on site showed elevated levels of TCE in both soil and groundwater, and in 1995 the site was assigned a Class 2 status by NYSDEC. In February 2000, a ROD was issued for the site selecting air sparging/soil vapor extraction (AS/SVE) as the remedy to address the contaminated soils and groundwater. The system was constructed in October 2000 followed by initial treatment activities in November 2000 (NYSDEC 2003).

Site C - 125 State Street

Site C is located at 125 State Street and is approximately one acre in size. From 1984 to 1996 the site was occupied by the Tishcon Corporation (Tishcon). Manufacturing operations at Tishcon consisted primarily of the production of dietary supplements and vitamin products via a dry blending process. From 1985 to 1993, methylene chloride, 1,1,1-trichloroethane (1,1,1-TCA) and methanol were used in tablet coating processes conducted at the facility. As part of operating procedures, equipment was rinsed in a driveway fitted with several storm drains. An investigation conducted by the Nassau County Department of Health (NCDOH) indicated the presence of chlorinated VOCs and metals in four storm drains at the site, and requested that contaminated material be removed from storm drains and a distribution box on the property in August 1993. The site was placed on the Registry in 1995 and issued a Class 2 status. The excavation and restoration of contaminated areas was completed as part of an Interim Remedial Measure (IRM) in October 1997. A ROD for the site was issued in January 1998, and required the excavation and restoration of remaining contaminated source areas. Excavation and disposal of the material was conducted in early 1999, and the site was reclassified by NYSDEC to a Class 4 ranking in March of 2000 (NYSDEC 2003).

Site F - 68 Kinkel Street

Site F is located at 68 Kinkel Street and is approximately one-quarter of an acre in size. From 1982 to 1983, Tishcon conducted operations at the site which involved the encapsulation of materials. It was reported that during these processes, 1,650 gallons of TCE as well as 8,000 gallons of methylene chloride and 3,000 gallons of shellac were used. The site was added to the NYSDEC Registry under Class 2 status in 1995. A State Superfund investigation was completed in July 1996, and in January 1997, a ROD requiring no action was issued. The site was delisted from the Registry in December of 1997 (NYSDEC 2003).

Site K - 62 Kinkel Street

Site K is located at 62 Kinkel Street, west of the intersection of Old Country Road and the Wantagh State Parkway. The LAKA Tool and Stamping Company (Co), Incorporated (Inc.), occupied and conducted metals stamping at the site from 1971 to 1978. LAKA Industries, Inc., the parent company, operated the site from 1979 to 1984 as a machine shop specializing in tools, dies and precision stamping; both companies used TCE and lubricating oils as part of their operating procedures. In 1996, the site was issued a Class 2 status. Subsequently, a RI/FS was conducted to define the nature and extent of contamination at the site. Results of the RI/FS confirmed the presence of soil contamination in the vicinity of an onsite cesspool and an area located in a catch basin found downgradient of the site. To address the soil contamination, the NYSDEC issued a ROD in February 2000, followed by the excavation of contaminated soils in May 2001; however, remedial activities did not address groundwater contamination (NYSDEC 2003).

Site N - 750 Summa Avenue

Site N is located at 750 Summa Avenue and is currently occupied by EZ-EM, a company that specializes in imaging and diagnostics for treating gastrointestinal diseases. EZ-EM along with other parties owned the property since 1982. Prior to EZ-EM ownership, Micro Industries, a machine shop occupied the site from 1971 to 1982. From 1968 to 1971 Advance Food Service Equipment Manufacturing occupied the site as a stainless steel kitchen equipment supplier. Advance Food Service stored and used 1,1,1-TCA and other solvents during their occupancy. In 1978, the NCDOH required a floor drain near a vat used for degreasing operations be sealed as sludges sampled from a dry-well contained levels 1,1,1-TCA. In 1985, the vat was removed from the site. Degreaser sludges containing a mixture of 1,1,1-TCA and waste oil were stored in drums in the rear of the facility according to records from 1978. The site was classified on the Registry as a Class 4 ranking (LM&S 1996; NYPIRG website).

Site V - 29 New York Avenue

Site V is located at 29 New York Avenue and is approximately one acre in size. The site was developed in 1952, and was used to manufacture electronic equipment until the late 1970s. From 1979 to 1991 Tishcon occupied the site until it was sold to Equity 1 Associates in 1991. In 1995 the site was issued a Class 2 status on the Registry as part of the Tishcon Brooklyn Ave site. A 1996 study investigating soils/sediments collected from onsite catch basins showed levels of 1,1,1-TCA-related compounds

above cleanup criteria. Based on these results, the NYSDEC listed the Tishcon 29 New York Ave site as a separate Class 2 site on the Registry in March 1998. In December 1999, a RI was completed and results were presented to the NYSDEC followed by the removal of contaminated materials from an onsite cesspool in August 2000. Based on the results of that investigation a no further action ROD was signed in March 2002, and the site was delisted from the Registry later that year (NYSDEC 2003).

1.1.2.2 Lawler, Matusky, and Skelly Engineers LLP 2000 RI/FS

Several state funded remedial investigations at the NCIA were conducted from 1995 to through January 2000. In September of 2000, Lawler, Matusky, and Skelly Engineers LLP completed a RI/FS report which summarized all the groundwater data collected during the various remedial investigations. The activities conducted during the RI include the following: installation of four shallow monitoring wells and sampling at fifteen hydropunch locations downgradient of NCIA in the summer of 1996, followed by five rounds of monitoring well sampling. The first round, completed in the summer of 1996, consisted of sampling 37 existing wells and the 4 newly installed shallow wells. The second round, completed in the summer of 1997, consisted of sampling at eleven hydropunch locations south of Old County Road as well as the 41 monitoring wells from the first round. The third and fourth rounds, completed in the spring and summer 1999, consisted of sampling four Bowling Green early warning wells (previously installed and sampled in July of 1998) and the 41 existing monitoring wells. Total VOCs concentrations in the third and fourth rounds ranged from non-detect to 29,230 micrograms per Liter ($\mu\text{g/L}$). The final round, completed during January of 2000, consisted of sampling the four Bowling Green early warning wells and 22 existing monitoring wells. Total VOCs concentrations in the final round ranged from non-detect to 27,339 $\mu\text{g/L}$.

Analytical results obtained from the five rounds of groundwater sampling showed concentrations of VOCs exceeding Class GA groundwater standards for PCE, 1,1,1-TCA, and their breakdown products. The results of the RI in combination with operational history analysis concluded that past activities at the various sites within the NCIA has resulted in significant off-site groundwater contamination. A total of three groundwater plumes were identified as contributing to the off-site VOC contamination. One plume was identified in the central section of NCIA, one plume in the eastern portion of NCIA, and one plume in the western section. The three groundwater plumes are concluded to be affecting both the Upper Glacial Aquifer (UGA) and the upper zones of the Magothy Aquifer.

Lawler, Matusky, and Skelly Engineers LLP presented 11 alternatives in the September 2000 RI/FS Report. Each alternative did not include remedies for subsurface soil and potential sources since these matrices are part of NYSDEC's On-Site Remedial Program.

Following the RI/FS, NYSDEC continued to monitor the four Bowling Green early warning wells on a quarterly basis. In addition, eight monitoring wells were installed to the southwest of the Bowling Green production wells in October 2001, and a 300

foot deep monitoring well was installed in July of 2002. These nine monitoring wells were also continually monitored on a quarterly basis.

1.1.2.3 NYSDEC October 2003 Record of Decision

In October of 2003, NYSDEC in consultation with New York State Department of Health (NYSDOH) presented a ROD for the selected remedy for OU 3 which consists of off-site groundwater primarily located to the south of the NCIA. NYSDEC selected full plume remediation of upper and deep portions of the aquifer (to 225 feet below ground surface (bgs)) with in-well vapor stripping/localized vapor treatment as the remedy.

Under this remedy, the groundwater contaminant plume is treated in-situ using a series of groundwater circulation wells (also known as in-well stripping systems), see Appendix F for a schematic diagram. The circulation well system creates in-situ vertical groundwater circulation cells by drawing groundwater from an aquifer formation through one screen section of a double-screen well and discharging it through the second screen section. A blower is used to achieve upward groundwater flow and bubbling air within the cell which drives aerated water out of the upper well screen. The groundwater circulation allows the air to capture the VOC contamination which is then removed by a vacuum blower and directed through a granulated active carbon (GAC) filtration system.

A 225 foot vapor stripping well with ancillary systems was installed foremost for the purpose of a pilot study. Following the pilot study three additional 225 foot vapor stripping wells, four 200 foot vapor stripping wells, and three 140 foot vapor stripping wells, including the ancillary systems, will be installed.

A long term groundwater monitoring program is also part of the ROD. Nine newly installed monitoring wells downgradient of Old Country Road and thirteen existing wells will be conducted quarterly for the first two years and periodically thereafter. Continued monitoring will also be conducted at the two existing Bowling Green Water District supply wells. Operation and maintenance of the treatment system and monitoring activities will take place until the remediation goals are achieved.

1.1.2.4 O'Brien and Gere's OU 4 Phase 1 and 2 Off-site Vapor Intrusion Investigation

In 2006, NYSDEC tasked O'Brien and Gere with the first vapor intrusion investigation for this Site to assess whether vapor phase contaminants migrating in groundwater or the vadose zone from the NCIA were volatilizing and entering structures in an area surrounding the NCIA. The investigation was divided into two phases which are summarized below.

Phase 1 Investigation

The Phase 1 Investigation was conducted from August 11 through September 22, 2006. During this time period, two soil vapor probes were installed at 38 locations for a total of 76 soil vapor sampling ports. The sampling ports were located at building

foundation depth (approximately 8 feet bgs) and 6 to 10 feet above the water table (approximately 29 to 45 feet bgs). The water table was determined periodically by measuring the depth to water from nearby monitoring wells or drilling to 50 feet bgs and conducting a water level measurement. The soil vapor samples were collected with 1-Liter Summa canisters with a 2-hour regulator. Tracer gas tests were also performed at several soil vapor ports to ensure the quality of the bentonite seal.

Results from the Phase 1 Investigation showed chlorinated and non-chlorinated hydrocarbons at elevated levels. PCE concentrations ranged from 2.85 to 1,086 micrograms per cubic meters ($\mu\text{g}/\text{m}^3$). Three soil vapor samples exceeded the New York State air guideline for PCE ($100 \mu\text{g}/\text{m}^3$). Trichloroethene (TCE) concentrations ranged from non-detect to $363 \mu\text{g}/\text{m}^3$. Seven soil vapor samples exceeded the New York State guideline for TCE ($5 \mu\text{g}/\text{m}^3$). Benzene concentrations ranged from 2.3 to $182 \mu\text{g}/\text{m}^3$. Based on the results of the Phase 1 Investigation the NYSDEC and NYSDOH proposed additional soil vapor sampling of residences and public buildings within the area. A table presenting the analytical results of the Phase 1 Investigation is provided in Appendix A of the Work Plan.

Phase 2 Investigation

The Phase 2 Investigation was conducted on September 14, 2007. Six indoor air samples were collected within the W.T. Clarke High School to determine the hazard of VOC exposure to students. Three canisters were deployed in the basement and three were deployed on the first floor of the high school to accurately delineate the soil vapor intrusion pathway. The first floor samples were collected at approximately four feet above the floor surface to gain an accurate reading of the breathing zone. In addition, an ambient air summa canister was placed outdoors between the middle school and the athletic fields approximately five feet above the ground surface. O'Brien and Gere noted that the placements of the canisters were not among any objects or materials that would impact the analytical results.

Results from the Phase 2 Investigation showed detections of chlorinated and non-chlorinated hydrocarbons. PCE concentrations ranged from non-detect to $2.28 \mu\text{g}/\text{m}^3$. TCE concentrations ranged from non-detect to $3.71 \mu\text{g}/\text{m}^3$. Methylene chloride concentrations ranged from 0.671 to $1.91 \mu\text{g}/\text{m}^3$. Carbon tetrachloride concentrations ranged from non-detect to $0.831 \mu\text{g}/\text{m}^3$. Benzene concentrations ranged from 0.390 to $1.95 \mu\text{g}/\text{m}^3$. Toluene concentrations ranged from 2.95 to $8.24 \mu\text{g}/\text{m}^3$. Lastly, m&p-xylene concentrations ranged from 1.68 to $4.55 \mu\text{g}/\text{m}^3$. The results of the Phase 2 Investigation are presented in Appendix A of the Work Plan.

Vapor intrusion sampling at sixteen additional residences, the water department, and high school were included in the Phase 2 scope of work; however, the sampling was not completed due to the conclusion of the heating season. The investigation of these sampling locations was integrated into the Work Plan.

1.1.2.5 CDM 2008 Soil Vapor Intrusion Investigation

In March of 2008, CDM conducted a Soil Vapor Intrusion Investigation which included soil vapor and groundwater sampling at five direct push locations at each of the seven sites (Site A, B, C, F, K, N, & V) of the NCIA. Soil vapor samples were collected from each of the five direct push locations at three depth intervals, at foundation depth (approximately 8 feet bgs), 25 feet bgs, and two feet above the groundwater table (approximately 45 feet bgs), for VOC analysis. Outdoor (ambient) air samples were collected each day of soil vapor sampling to represent the outdoor air quality surrounding the structure. Groundwater samples were also collected from co-located boreholes adjacent to the soil vapor sample locations at the surface of the groundwater table, estimated at 48 feet bgs, for VOC analysis.

The results of the investigation identified several potential source areas contributing to the PCE and 1,1,1-TCA groundwater plume migrating from NCIA. The site characterization report completed by CDM proposes mitigation of those source areas as well as additional sampling after mitigation is complete to ensure all source areas were identified and properly addressed.

1.2 Site Geology and Hydrogeology

The off-site area is located above the UGA which consists of Upper Pleistocene deposits of poorly sorted sand and gravel to approximately 80 feet bgs. Beneath the UGA lies the Magothy aquifer which is comprised of finer sands, silt and small amounts of clay. Previous investigations have indicated that the Magothy formation may sometimes be found at considerable shallower depths (60-80 feet bgs) within the area when compared to other portions of Long Island. Within the NCIA, the UGA and Magothy formations are in direct hydraulic connection as no other hydro-geologic units are found between them; however, clay lenses are often found within the upper portions of the Magothy. Previous investigations conducted onsite indicated that the water table is approximately 48 feet bgs and that groundwater flow is in a southwesterly direction.

1.3 Project Objectives

The objective of this work assignment is to determine if VOCs are present in the sub-slab vapor and indoor air at several residences, the Town of Hempstead Water Department Facility, and the W.T. Clarke High School. The owner names and addresses at the residential locations are being kept confidential in this report and have been provided to NYSDEC separately. The targeted properties are located within the area affected by the groundwater plumes originating in the NCIA and were identified in a previous study (WA #D00490-40) as potential candidates for additional indoor air sampling. The vapor intrusion investigation is designed to determine if vapor intrusion poses a potential threat to human health and the environment at the selected locations. In order to achieve this objective, the following activities were conducted:

- Task 1 – Work Plan Development
The development of a site specific work plan which included a site specific QAPP and Health and Safety Plan (HASP).
- Task 2 – Citizen Participation Plan (CPP) Mailing List and Fact Sheet
The addresses of adjacent property owners, local officials, and advocacy groups were determined. CDM also assisted NYSDEC with the preparation of a fact sheet to be distributed to the addresses compiled.
- Task 3 – Phase 3 Off-site Vapor Intrusion Investigation
The investigation included:
 - Sub-Slab Vapor Sample Collection: collection of sub-slab vapor samples at six residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.
 - Indoor (Basement) Air Sample Collection: collection of indoor (basement) air samples at seven residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.
 - Outdoor (Ambient) Air Sample Collection: collection of outdoor (ambient) air samples at seven residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.
 - Investigative Derived Waste: proper handling of derived waste from the investigation.
- Task 4 – Site Characterization Report
The field documentation and reporting of the vapor intrusion investigation.

Section 2

Physical Setting

The following subsections describe the environmental conditions of the New Cassel Industrial Area site.

2.1 Regional Geology

A history of coastal submergence and emergence spanning the Cretaceous Period, significant differential erosion during the Cenozoic, and glaciation during the Quaternary is reflected in the present day geology of Long Island. The geology of Long Island is characterized by a southeastward-thickening wedge of unconsolidated sediments unconformably overlying a gently-dipping basement bedrock surface. The wedge ranges in thickness from zero feet where it outcrops along the north shore in Queens, up to about 2,000 feet along the south shore barrier islands. A generalized cross section through Nassau County is shown in Figures 2-1 and 2-2.

2.1.1 Basement

Basement is composed of Precambrian to Early Paleozoic igneous or metamorphic consolidated bedrock. Unconformably overlying the basement is a thick succession of Late Cretaceous deposits: the Raritan and overlying Magothy Formations, both of fluvio-deltaic depositional origin. The Upper Cretaceous deposits are unconformably overlain by a veneer of Pliocene and Pleistocene deposits, chiefly of glacial origin.

2.1.2 Cretaceous

Raritan Formation: The Raritan Formation is divided into the basal Lloyd Sand Member and the overlying Raritan Clay Member. The Lloyd Sand rests unconformably on bedrock and is about 150 feet thick in the vicinity of the Site. The top of the Lloyd Sand is found at approximately 200-250 feet below mean sea level (msl). It is composed of white and grey fine to coarse sand and gravel, commonly with a clayey matrix. The contact with the overlying clay member is gradational.

The Raritan Clay Member is composed chiefly of bedded variegated clay and silt, locally containing interbedded sands. Lignite fragments and iron and pyrite nodules are common. The clay member is approximately 100 feet thick in the vicinity of the Site (Smolensky, et al. 1989). The Raritan Clay is the most widespread hydrologic confining layer on Long Island. The Raritan's updip erosional pinchout generally is located subparallel to the northern coast of Nassau County. The clay unit dips gently to the south-southeast.

Matawan Group-Magothy Formation (Magothy): The Magothy unconformably overlies the Raritan; the contact is commonly marked by a change from the solid clays of the Raritan Clay Member to coarse sands and gravels of the basal unit of the Magothy. The dominant Magothy lithology generally is fine to medium quartz sand, interbedded clayey sand with silt, clay, and gravel interbeds or lenses. Interbedded clay is more common towards the top of the formation. The thickness of the Magothy

varies between 100 feet in the vicinity of the Site to over 800 feet beneath the barrier islands.

2.1.3 Cenozoic-Quaternary

After the Cretaceous, deep erosion of the land surface took place as a response to fluctuations in sea level. Sedimentological evidence indicates that sea level falls exposed the entire Atlantic continental margin during the Miocene epoch, which would have promoted rejuvenation and deep incision of rivers and streams across the Coastal Plain. Later deposition of abundant fluvial and glacial clastic deposits during the Pliocene and Quaternary filled these incised buried valleys. The top of the Cretaceous sequence is marked by a highly irregular erosion surface upon which rests deposits of Pleistocene and, in some places, Pliocene age.

Deposits of Pleistocene age mantle the Cretaceous formations. Within the study area, the Pleistocene deposits include three depositional sequences: the fluvial Jameco Gravel and marine Gardiners Clay; and the much more widespread Late Pleistocene glacial deposits of the Wisconsin glacial stage. Undifferentiated gravels and clays described in buried valleys within southern Long Island have been attributed to the Jameco Gravel and Gardiners Clay units. The Jameco Gravel and Gardiners Clay formations are well-defined, mapable stratigraphic units beneath the southern margin of Long Island where they are of hydrogeological significance. These stratigraphic units are not recognized in the vicinity of the Site. The remainder of the Pleistocene succession belongs to the Wisconsin glacial stage Upper Glacial Deposits.

The thickness of the Pleistocene Upper Glacial Deposits in the study area varies but averages 100 feet. The thickness and distribution of the Pleistocene Upper Glacial Deposits were controlled by the older, now buried paleotopography discussed above. The pattern of stream and river valleys that dissected the surface of Long Island during the Cenozoic likely was later modified by Pleistocene overriding ice sheets and meltwater erosion and deposition.

2.2 Regional Hydrogeology

The hydrogeology of Long Island has been well documented over the years by the United States Geological Survey (USGS) and others. Three major aquifers are present on Long Island: the Upper Glacial aquifer (UGA), the Magothy aquifer and the Lloyd aquifer. A generalized cross section through Nassau County is shown in Figures 2-1 and 2-2. Based on the cross section, the Magothy Aquifer is not present in the Site area. Groundwater contours prepared for Nassau County's Groundwater Monitoring Program based on water levels collected in public wells in 2001, 2002, and 2003 indicates that the groundwater in the UGA (water table) in the Site area generally flows to the southwest, but that there may be a northwest component to the groundwater flow. The mapping shows groundwater in the Lloyd aquifer flows more westerly in this area. Mapping conducted by Kilburn and Krulik suggests that there is a groundwater high in the Site area which may result in radial flow from the Site.

2.2.1 Bedrock

The bedrock in the area has been mapped as the Hartland Formation of Middle Ordovician to Lower Cambrian Age. The bedrock surface generally slopes southeastward from about 350 to 800 feet below sea level except in the northernmost parts of the Oyster Bay area where glacial scouring has created north-northwestward dipping valleys. The formation consists of highly weathered biotite-garnet-schist with low hydraulic conductivity. A thick saprolitic zone 50 to 100 feet thick, consisting of white, yellow, and gray clay, underlies most of the peninsula except in the northernmost part.

2.2.2 Lloyd Aquifer

The Lloyd Sand Member of the Raritan Formation of the Late Cretaceous Age overlies the saprolitic bedrock surface and is Long Island's deepest aquifer. The Lloyd sand was deposited as a series of braided streams and deltaic deposits consisting of white and pale yellow sand with interbedded lenses of gravel and white clay. The aquifer does not outcrop on Long Island and is believed to extend to the north beneath Long Island Sound in eastern Nassau County and in Suffolk County, and offshore to the south, beyond the barrier beaches. The Lloyd aquifer is confined in most places, except where the overlying Raritan clay has been eroded away. The thickness of the Lloyd aquifer varies from zero feet where it is not present along the north shore of Nassau County, to more than 500 feet in the southeastern areas of Nassau County. The average horizontal hydraulic conductivity is reported to be approximately 40 feet per day (ft/day) with a 10:1 vertical anisotropy.

2.2.3 Raritan Clay

Overlying the Lloyd aquifer is the Cretaceous Age clay member of the Raritan Formation, referred to as the Raritan clay. The Raritan clay is the major confining unit on Long Island, ranging between 150 and 250 feet in thickness. Like the Lloyd aquifer, the Raritan clay is absent from areas of northern Queens and northern Nassau County where it had been eroded. The Raritan clay outcrops in parts of Queens, and is believed to be present north of the island beneath Long Island Sound, and south of the island, beneath the barrier islands. This confining unit consists of solid, multicolored, compact clay (gray, white, red, or tan) with interbedded lenses of sand. The average vertical hydraulic conductivity is reported to be approximately 0.001 ft/day.

2.2.4 North Shore Aquifer

The North Shore aquifer consists of a sequence of Pleistocene-age sediments found only in the northwestern, central, and northeastern parts of the study area. The aquifer consists of moderately sorted stratified drift and outwash deposits that infilled the low-lying areas after the partial removal of the Cretaceous deposits and parts of the bedrock (saprolitic zone) by glacial erosion. The deposits consist of poor to moderately sorted brown and olive gray sand, silt, and gravel. It contains subangular to subrounded quartz grains, rock fragments, unstable opaque minerals, and a large

percentage of biotite and muscovite. The North Shore aquifer deposits are referred to locally as the Jameco Gravel.

2.2.5 North Shore Confining Unit

The North Shore confining unit is a sequence of Pleistocene-aged clay and silt deposits that are locally present along the northern shore of Nassau County. The unit consists of marine and postglacial lake deposits including olive brown and olive gray clay and silt deposits with minor lenses containing shells. The unit contains a minor sand unit that is moderately permeable. The presence of the North Shore confining unit in the Site area is questionable.

2.2.6 Upper Glacial Aquifer (UGA)

The UGA is the surficial unit on Long Island and is therefore entirely unconfined. Along the Harbor Hill and Ronkonkoma terminal moraines and parts of the north shore, the unit is composed of till consisting of poorly sorted clay, sand, gravel, and boulders. The till is generally poorly permeable and may contain perched water. The outwash deposits that are found are mainly between, and south of, the moraines. The outwash deposits are moderately to highly permeable, consisting of gray, brown, and yellow fine to very coarse sand and gravel. The UGA ranges up to 600 feet thick, however the saturated thickness is often much lower. The estimated average horizontal hydraulic conductivity generally exceeds 225 ft/day.

2.3 Site-Specific Geology and Hydrogeology

The site is located above the UGA which consists of Upper Pleistocene deposits of poorly sorted sand and gravel to approximately 80 feet bgs. Beneath the UGA lies the Magothy aquifer which is comprised of finer sands, silt and small amounts of clay. Previous investigations have indicated that the Magothy formation may sometimes be found at considerable shallower depths (60-80 ft bgs) within the area when compared to other portions of Long Island. Within the New Cassel Industrial Area, the UGA and Magothy formations are in direct hydraulic connection as no other hydrogeologic units are found between them; however, clay lenses are often found within the upper portions of the Magothy. The soil vapor intrusion investigation conducted onsite indicated that the water table is at 48 feet bgs and that groundwater flow is in a southwesterly direction.

Section 3

Site Investigation

3.1 Vapor Intrusion Investigation

The following subsections describe the scope of work conducted from March 3 to 12, 2009. The investigation procedures were performed in accordance with the Final Work Plan dated October 30, 2008. The vapor intrusion investigation was conducted at seven residential locations (R1, R7, R8, R9, R10, R11, and R14), the Town of Hempstead Water Department Facility (R12), and the W.T. Clark High School (WC) presented on Figure 1-1.

The investigation included:

- Collecting sub-slab vapor samples at six residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.
- Collecting indoor (basement) air samples at seven residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.
- Collecting outdoor (ambient) air samples at seven residences, the Town of Hempstead Water Department Facility, and the W.T. Clark High School.

These samples were collected in accordance with the *"Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006"* and the applicable elements, more specifically Section 3.7 of the *"Draft Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated December 2002"*.

Originally sixteen residential locations were proposed for vapor sampling during this field investigation. Four out of the seventeen residences (R2, R5, R6 and R17) declined to have their residence sampled. At an additional four out of the seventeen residences (R3, R4, R13 and R15) the field team was unable to contact the owner. A letter stating that attempts were made to contact the resident was left on the door step of each of the four residences by the field team during the commencement of the field investigation. None of the four residences contacted the field team following the letter drop-off. The letter is provided in Appendix A. One of the seventeen residences (R16) canceled the scheduled sampling appointment due to a personal matter.

One field change was implemented during the vapor intrusion investigation. Residence R9 did not have a basement, rather a crawl space located under the residential structure. The crawl space could only be accessed through a small opening in front of the house. The floor of the crawl space was dirt and a concrete slab was not present. Therefore only an indoor (basement) air and outdoor (ambient) air sample was collected from this property. The summa canister for the basement air sample collection was placed inside the crawl space. Pictures of the crawl space are provided in Appendix B. An NYSDOH questionnaire was not filled out for this property since the owner of the residence was not present and the occupants were not capable of

providing the appropriate information. The inability to complete the questionnaire is noted since NYSDOH requires a completed form for each structure participating in a vapor intrusion investigation.

3.1.1 Sub-slab Vapor Sample Collection

Sub-slab vapor samples were collected at six residences (R1, R7, R8, R10, R11, and R14), the Town of Hempstead Water Department Facility, and from three locations within the W. T. Clark High School. A total of ten sub-slab samples were collected plus one duplicate sample.

The sub-slab sample locations were installed as permanent points to facilitate future sampling events. After the slab had been inspected, the location of any subsurface utilities determined, and the ambient air surrounding the proposed sampling location screened with a photoionization detector (PID), a hammer drill was used to advance a boring to a depth of approximately two inches beneath the building slab. A permanent port constructed of stainless steel tubing and fittings was installed in the opening. The annular space between the borehole and the sample tubing was filled and sealed with anchoring cement.

Teflon tubing was connected to the stainless steel sample port and utilized for sample collection. Flow rates for both purging and sample collection were at 0.1 liters per minute to minimize ambient air infiltration during sampling. Approximately three volumes of gas were purged from the subsurface probe. PID readings were observed during purging and the highest reading is presented on Table 2-1.

The end of the tubing was connected directly to the summa canister's regulator intake valve. The sample was then collected with a laboratory-certified summa canister with a dedicated regulator set for 24-hour sample collection. The sub-slab vapor parameters are presented in Table 2-1.

3.1.2 Indoor (Basement) Air Sample Collection

Indoor (basement) air samples were collected in the basement at six residences (R1, R7, R8, R10, R11, and R14), the Town of Hempstead Water Department Facility, and from three locations within the W. T. Clark High School. An indoor sample was also collected inside the crawl space of a residence (R9). A total of eleven indoor air samples were collected plus one duplicate sample.

A NYSDOH Indoor Air Quality Questionnaire and Building Inventory was completed for each structure where indoor air testing was conducted except for residence R9, as mentioned in Section 2.1. NYSDOH questionnaires are provided in Appendix C. Associated photographs of chemicals stored within the buildings are presented in Appendix B.

All indoor air samples were collected with a laboratory-certified summa canister regulated for a 24-hour sample collection. The summa canister was placed next to the

sub-slab sampling summa canister. The indoor air parameters are presented in Table 2-1.

3.1.3 Outdoor (Ambient) Air Sample Collection

An outdoor (ambient) air sample was collected at each of the nine sampling locations (WC, R1, R7, R8, R9, R10, R11, R12, and R14). The outdoor air sample was collected with a laboratory-certified summa canister regulated for a 24-hour sample collection. The summa canister was placed upwind and in a location that was non-obtrusive for the property owner. The outdoor air sample collected at the W.T. Clark High School was located in the courtyard to avoid tampering by students. The outdoor air parameters are presented in Table 2-1.

3.1.4 Investigative Derived Waste

Sub-slab vapor port dedicated tubing was disposed of as solid waste.

3.1.5 Sample Location

A global positioning unit (GPS) hand-held unit was not utilized to identify the sub-slab sample locations. Instead, sample locations were measured from known points and sketched in the NYSDOH Questionnaire, provided in Appendix C.

3.2 Sample Identification, Laboratory Analysis and Validation

Each sample collected was designated by an alphanumeric code that identifies the type of sampling location, matrix sampled, and the specific sample designation (identifier). Site specific procedures are described in the QAPP.

All samples were analyzed by an NYSDOH-approved Environmental Laboratory Approval Program (ELAP) certified laboratory (Air Toxics). Air samples were analyzed for VOCs using the Environmental Protection Agency (EPA) Method TO-15 Hi/Lo selected ion monitoring (SIM) TCE list. The analysis for vapor samples achieves detection limits of 1 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) for each compound except for TCE which has a detection limit of 0.25 $\mu\text{g}/\text{m}^3$. A NYSDEC Analytical Services Protocol (ASP) Category B data deliverable is provided for these analyses.

All samples collected were validated in accordance with the NYSDEC Data Usability Summary Report (DUSR) guidance by a party that is independent of the laboratory which performed the analyses and CDM. A usability analysis was conducted by a qualified data validator (Data Validation Services) and DUSRs are provided in Appendix E.

3.3 Field Documentation and Reporting

Field notebooks were used during all on-site work. The dedicated field notebook was maintained by the field manager overseeing the site activities. A copy of the field log book is provided in Appendix D. In addition to the notebook, field and sampling procedures were photo-documented and included in Appendix B.

Section 4

Analytical Results

This section presents the analytical results for the vapor intrusion sampling conducted as part of this investigation.

4.1 Vapor Intrusion Results

Vapor intrusion samples were collected at 7 residences (R1, R7, R8, R9, R10, R11, and R14), the Town of Hempstead Water Department Facility (R12), and from W.T. Clark High School (WC). Sub-slab vapor, indoor (basement) air, and outdoor (ambient) air samples were collected to determine if vapor intrusion exists at the selected locations.

An ambient air sample was collected each day sub-slab vapor sampling was conducted and was labeled with an "AA" in accordance with the approved Work Plan. The analytical results for the ambient air sample showed several detections but below the NYSDOH Air Guideline Values.

Analytical results for the vapor intrusion investigation are presented in Appendix E and Figure 3-1. Since PCE and its degradation products represent the contaminants of concern at this site, Figure 3-1 focuses on these compounds as a means of correlating their occurrences to the known contamination in the area. The 2006 NYSDOH Vapor Intrusion Guidance indicates that the State of New York does not have any standards, criteria or guidance for subsurface vapors. However, air guideline values were compared to vapor concentrations to determine if exceedances exist. Table 4-1 presents the New York State Guideline Values. New York State Guidelines for methylene chloride, PCE and TCE are 60 $\mu\text{g}/\text{m}^3$, 100 $\mu\text{g}/\text{m}^3$, and 5 $\mu\text{g}/\text{m}^3$, respectively. Tables 4-2 and 4-3 provide the NYSDOH sub-slab/indoor air matrices which were used to determine if further action is necessary at each sampling location.

The vapor concentrations of PCE ranged from non-detect to 15 $\mu\text{g}/\text{m}^3$. The highest PCE concentration of 15 $\mu\text{g}/\text{m}^3$ was detected in the sub-slab vapor sample taken at R8. The vapor concentrations of TCE ranged from non-detect to 14 $\mu\text{g}/\text{m}^3$. The highest TCE concentration of 14 $\mu\text{g}/\text{m}^3$ was detected in the sub-slab vapor sample collected from residence R7, which when coupled with the detection of .4 $\mu\text{g}/\text{m}^3$ in the associated indoor air may need additional monitoring in accordance with NYSDOH Matrix 1 (see Table 4-2). The vapor concentrations of 1,1,1- TCA ranged from non-detect to 16 $\mu\text{g}/\text{m}^3$. The highest 1,1,1-TCA concentration of 16 $\mu\text{g}/\text{m}^3$ was detected in the indoor air sample collected from residence R10.

Other compounds that were detected were chloroform and methylene chloride. The vapor concentrations of chloroform ranged from non-detect to 81,000 $\mu\text{g}/\text{m}^3$. The highest chloroform concentration of 81,000 $\mu\text{g}/\text{m}^3$ was detected in the sub-slab vapor sample from the Town of Hempstead Water Department Facility (R12). Methylene chloride was detected in vapor samples at concentrations ranging from non-detect to 14 $\mu\text{g}/\text{m}^3$. The maximum methylene chloride concentration of 14 $\mu\text{g}/\text{m}^3$ was detected in the first indoor air sample collected at W. T. Clarke High School (WC).

4.1 Sub-slab and Indoor Air Investigation

4.1.1 Residence R1

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-1. Methylene chloride, PCE and TCE were detected in the indoor air sample at concentrations of 1.9, 1.5 and 2.1 $\mu\text{g}/\text{m}^3$, respectively. Methylene chloride was detected in the sub-slab vapor sample at a concentration of 2 $\mu\text{g}/\text{m}^3$. Methylene chloride and *trans*-1,2-dichloroethene were detected at concentrations of 0.97 and 2 $\mu\text{g}/\text{m}^3$, respectively in the ambient air sample.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance recommends that reasonable and practical actions be taken to identify sources and reduce exposure to TCE with respect to the indoor air concentration of 1.5 $\mu\text{g}/\text{m}^3$ and no detection in the sub-slab vapor sample. Soil Vapor/Indoor Air Matrix 2 (Table 4-3) indicates no further action for PCE.

4.1.2 Residence R7

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-7. Methylene chloride and TCE were detected in the indoor air sample at concentrations of 3.5 and 0.4 $\mu\text{g}/\text{m}^3$, respectively. 1,1,1-TCA, chloroform, *cis*-1,2-dichloroethene, PCE, and TCE were detected in the sub-slab vapor sample at concentrations of 1.1, 23, 14, 2.2 and 14 $\mu\text{g}/\text{m}^3$, respectively. *Trans*-1,2-dichloroethene was detected in the ambient air sample at a concentration of 3.7 $\mu\text{g}/\text{m}^3$.

According to the Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance recommends that TCE should be monitored as appropriate with respect to the sub-slab and indoor air concentrations of 14 and 0.4 $\mu\text{g}/\text{m}^3$, respectively. Soil Vapor/Indoor Air Matrix 2 (Table 4-3) indicates no further action for 1,1,1-TCA or PCE.

4.1.3 Residence R8

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-8. PCE was detected in the indoor air sample at a concentration of 1.1 $\mu\text{g}/\text{m}^3$. 1,1,1-TCA and PCE were detected in the sub-slab vapor sample at concentrations of 2 and 15 $\mu\text{g}/\text{m}^3$, respectively. *Trans*-1,2-dichloroethene was detected in the ambient air sample at a concentration of 0.8 $\mu\text{g}/\text{m}^3$.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance indicates no further action since neither TCE nor carbon tetrachloride was detected. Soil Vapor/Indoor Air Matrix 2 (Table 4-3), indicates no further action for 1,1,1-TCA and PCE.

4.1.4 Residence R9

Only an indoor air and an ambient air sample were collected at residence R9. Chlorinated VOCs were not detected in the indoor air and ambient air samples collected at this location. Therefore no further action is recommended at this sampling location.

4.1.5 Residence R10

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-10. 1,1,1-TCA, chloroform, and methylene chloride were detected in indoor air at concentrations of 16, 1.3, and 5.3 $\mu\text{g}/\text{m}^3$, respectively. PCE was detected at a concentration of 4.3 $\mu\text{g}/\text{m}^3$ in the sub-slab vapor sample. 1,1,1-TCA was detected in the ambient air sample at a concentration of 0.39 $\mu\text{g}/\text{m}^3$.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance indicates no further action since neither TCE nor carbon tetrachloride was detected. Soil Vapor/Indoor Air Matrix 2 (Table 4-3), indicates no further action for PCE.

Soil Vapor/Indoor Air Matrix 2 also indicates that reasonable and practical actions be taken to identify source(s) and reduce exposures with respect to the 1,1,1-TCA indoor air concentration of 16 $\mu\text{g}/\text{m}^3$ and no detection in the sub-slab vapor sample.

4.1.6 Residence R11

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-11. TCE was detected in the indoor air sample at a concentration of 0.17 $\mu\text{g}/\text{m}^3$. Chloroform, PCE and TCE were detected in the sub-slab vapor sample at concentrations of 1.1, 6.5, and 0.36 $\mu\text{g}/\text{m}^3$, respectively. *Trans*-1,2-dichloroethene was detected in the ambient air sample at a concentration of 3.8 $\mu\text{g}/\text{m}^3$.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance indicates no further action for TCE. Soil Vapor/Indoor Air Matrix 2 (Table 4-3), indicates no further action for PCE.

4.1.7 Residence R14

A sub-slab vapor, indoor (basement) air and ambient air sample were collected at Residence R-14, located north of the Bowling Green Well Field. The only chemical detected at this site was chloroform at a concentration of 85 $\mu\text{g}/\text{m}^3$ in the sub-slab vapor sample. NYSDOH guidance does not provide any guidelines for chloroform.

4.1.8 Town of Hempstead Water Department Facility R12

A sub-slab soil, indoor (basement) air and ambient air sample and duplicate sample of each were collected at the Town of Hempstead Water Department Facility (R12). Chloroform and TCE were detected in the indoor air sample at concentrations of 150 and 0.23 $\mu\text{g}/\text{m}^3$, respectively. Chloroform was detected at a concentration of 81,000 $\mu\text{g}/\text{m}^3$ in the sub-slab vapor sample.

An ambient air sample was collected at R12. Vinyl chloride was detected in the ambient air sample at a concentration of 0.36 $\mu\text{g}/\text{m}^3$. Chloroform was detected in the duplicate ambient air sample at a concentration of 0.73 $\mu\text{g}/\text{m}^3$.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2) NYSDOH guidance suggests that no further action is needed for TCE. NYSDOH guidance does not provide any guidelines for chloroform.

4.1.9 W.T. Clark High School (WC)

Three sub-slab vapor samples, two indoor (basement) air samples, and one ambient air sample were collected at W.T. Clark High School (WC). Methylene chloride was detected in indoor air sample 1 (WC-BA1) at a concentration of 14 µg/m³. 1,1,1-TCA and methylene chloride were detected in indoor air sample 2 (WC-BA2) at concentrations of 1.3 and 1.7 µg/m³, respectively. Chloroform was detected in sub-slab vapor sample 1 (WC-SB1) at a concentration of 5.3 µg/m³. Chloroform and TCE were detected in sub-slab vapor sample 2 (WC-SB2) at concentrations of 2 and 0.22 µg/m³, respectively. PCE and TCE were detected in sub-slab vapor sample 3 (WC-SB3) at concentrations of 1.2 and 0.31 µg/m³, respectively.

According to Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance indicates no further action for TCE. Soil Vapor/Indoor Air Matrix 2 (Table 4-3), indicates no further action for PCE and 1,1,1-TCA.

Section 5

Conclusions and Recommendations

This section presents the conclusions and recommendations which are based upon the analytical results from the off-site vapor intrusion investigation conducted for NYSDEC.

5.1 Conclusions

Chlorinated VOCs were detected at low levels in all off-site locations sampled with the exception of off-site residence R9, located southeast of the NCIA. In general, the sub-slab vapor samples contained slightly higher chlorinated VOC concentrations than the indoor air samples, with the exception of the indoor air sample taken at R10, located directly south of R9. A slightly elevated concentration of 1,1,1-TCA was detected in the indoor air sample from R10, but not in the sub-slab vapor sample, which according to the NYSDOH's Soil Vapor/Indoor Air Matrix 2 (Table 4-3) could indicate that the concentration detected in the indoor air sample is likely due to indoor and/or outdoor sources rather than soil vapor intrusion. 1,1,1-TCA was not detected in the ambient (outdoor) air sample, indicating that the source most likely originated indoors. The NYSDOH indoor air quality questionnaire for R10 (Appendix C) indicated that carpet adhesives were used at this location, a potential source of 1,1,1-TCA.

NYSDOH's Soil Vapor/Indoor Air Matrix 1 (Table 4-2) indicated that the concentration of TCE detected in the indoor air sample at R1, and no detection in the sub-slab sample, is also likely due to indoor and/or outdoor sources rather than soil vapor intrusion. TCE was not detected in the ambient (outdoor) air sample, indicating that the source most likely originated indoors. The NYSDOH indoor air quality questionnaire for R1 (Appendix C) indicated that the wooden floor inside the residence has been stained recently. TCE could have been an ingredient in either the stain compound itself or in a stain remover and/or cleaner used prior to the wood stain treatment.

According to the Soil Vapor/Indoor Air Matrix 1 (Table 4-2), NYSDOH Guidance recommends that TCE should be monitored at R7 with respect to the sub-slab and indoor air concentrations of 14 and 0.4 $\mu\text{g}/\text{m}^3$, respectively. The NYSDOH Guidance states that monitoring is needed to confirm concentrations in the indoor air have not increased due to changes in pressure gradients or to evaluate relevant environmental data.

The majority of the vapor samples collected are within the 1,000 $\mu\text{g}/\text{L}$ VOC plume defined during the Phase I and II investigations conducted by O'Brien & Gere (see Figure 3 of Appendix A provided in the Work Plan). A data gap exists between off-site residence locations R1 and R7. The inability to collect samples at six proposed locations (R2, R3, R4, R5, R6 and R15) and a significant area between R6 and R7 not included in the scope of work is contributing to the data gap. The lack of sampling locations proposed by O'Brien and Gere between off-site residences R6 and R7 is most

likely due to the low detections of TCE (ranging from non-detect to 6.43 $\mu\text{g}/\text{m}^3$) observed during the Phase I and II investigation (see Figure 2 of Appendix A provided in the Work Plan). Off-site residence location R6 however is upgradient of Phase I and II vapor results detecting TCE concentrations ranging from 4.07 to 14.5 $\mu\text{g}/\text{m}^3$.

It can be concluded that the boundaries of the chlorinated solvent migration from NCIA have been confirmed due to the non-detect and low detections at the remaining sampling locations. Currently, migration of chlorinated solvents from NCIA is bound by R1 to the west, WC to the south, and R12, R11 and R10 to the east. Chloroform was detected in the indoor air and sub-slab vapor samples taken at the Town of Hempstead Water Department Facility at much higher concentrations than what was detected at the NCIA or at other off-site locations. Chloroform is commonly associated with water treatment systems and supply wells. Therefore the detection of the compound at Town of Hempstead Water Department Facility is considered not site related.

5.2 Recommendations

Due to the exceeding concentration of TCE detected at R7, the inability to collect a sample at R6, and the absence of sampling locations between R6 and R7, CDM recommends an additional investigation to properly assess soil vapor intrusion in relation to NCIA. It is suggested that up to ten structures be sampled for sub-slab, indoor, and outdoor air north of W.C., south of NCIA, east of R7, and west of R1, to properly fill the data gaps. It is also recommended that R7 be re-sampled for vapor intrusion to initiate the monitoring at this sample location indicated by Soil Vapor/Indoor Air Matrix 1 (Table 4-2).

TABLES

**Table 2-1
Soil Vapor Sampling Parameters
New Cassel Industrial Area Operable Unit 4
North Hempstead Westbury, NY**

Sample ID	Date	Time Started	Initial Pressure (inches Hg)	Time Collected	Final Pressure (inches Hg)	Pre-Sample VOC (ppm)	Post-Sample VOC (ppm)
R1							
NCIA4-R1SB-030309	3/3/2009	14:12	-30	14:20	-6	89.2	3
NCIA4-R1BA-030309		14:12	-25	14:20	0	NA	NA
NCIA4-R1AA-030309		14:16	-30	14:30	-5	NA	NA
R7							
NCIA4-R7SB-030309	3/3/2009	11:22	-29	11:22	-2	13	133
NCIA4-R7BA-030309		11:22	-30	11:22	-3	NA	NA
NCIA4-R7AA-030309		11:27	-30	11:20	0	NA	NA
R8							
NCIA4-R8SB-030309	3/3/2009	19:32	-27	19:39	-3	1,751	NA*
NCIA4-R8BA-030309		19:32	-27	19:39	-6.5	NA	NA
NCIA4-R8AA-030309		19:40	-28	19:48	0	NA	NA
R9**							
NCIA4-R9BA-030909	3/9/2009	9:15	-30	9:15	-7	NA	4.7
NCIA4-R9AA-030909		9:15	-30	9:15	0	NA	NA
R10							
NCIA4-R10SB-030909	3/9/2009	13:35	-29	13:35	-12	0.1	13.7
NCIA4-R10BA-030909		13:35	-30	13:35	-4	NA	NA
NCIA4-R10AA-030909		13:42	-30	13:42	-2	NA	NA
R11							
NCIA4-R11SB-030309	3/3/2009	9:58	-29	10:07	-4	0.7	7.6
NCIA4-R11BA-030309		9:58	-30	10:07	-1	NA	NA
NCIA4-R11AA-030309		10:03	-29	10:20	0	NA	NA
R12							
NCIA4-R12SB-030909	3/9/2009	12:23	-30	12:25	-6	0.1	1.6
NCIA4-R12SD-030909		12:23	-30	12:25	-2		
NCIA4-R12BA-030909		12:25	-30	12:25	-6	2.1	NA
NCIA4-R12BAD-030909		12:25	-28	12:25	-4		
NCIA4-R12AA-030909		12:32	-28	12:32	-2	NA	NA
NCIA4-R12AAD-030909		12:32	-30	12:32	-5		
R14							
NCIA4-R14SB-030509	3/5/2009	9:23	-29	9:23	-12	1	357
NCIA4-R14BA-030509		9:23	-29	9:23	-3	NA	NA
NCIA4-R14AA-030509		9:26	-30	9:18	0	NA	NA
WC							
NCIA4-WCSB1-031109	3/11/2009	11:16	-30	11:18	-7	NA*	
NCIA4-WCBA1-031109		11:16	-30	11:18	-7		
NCIA4-WCSB2-031109		11:05	-30	11:07	-10.5		
NCIA4-WCBA2-031109		11:05	-30	11:07	-10		
NCIA4-WCSB3-031109		10:47	-29	10:50	-4		
NCIA4-WCBA3-031109		10:47	-29	10:50	-5		
NCIA4-WCAA-031109		11:27	-29	11:36	-5		

Notes:

* - The MultiRae was encountering fresh air calibration issues and a VOC screening reading could not be conducted.

** - VOC screening and soil vapor sample was collected from crawl space under residence.

Acronyms:

AA - ambient air

BA - Basement Air

D - duplicate

Hg - mercury

ID - identification

NA - not applicable

NCIA4 - New Cassel Industrial Area Operable Unit 4

ppm - parts per million

R - residential

VOC - volatile organic compound

WC - highschool

Table 4-1
NYSDOH Air Guidelines
New Cassel Industrial Area Operable Unit 4
North Hempstead Westbury, NY

Chemical	Air Guidance Value ($\mu\text{g}/\text{m}^3$)
methylene chloride (MeCl) (also referred to as dichloromethane)	60
polychlorinated biphenyls (PCBs)	1 *
tetrachlorodibenzo-p-dioxin equivalents (TCDD)	0.00001 *
tetrachloroethene (PCE)	100
trichloroethene (TCE)	5

Notes:

*The guideline is specific to indoor air

Acronyms:

$\mu\text{g}/\text{m}^3$ - micrograms per meters cubed

Reference:

Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York.
 NYSDOH, October 2006.

Table 4-2
Soil Vapor/Indoor Air Matrix 1
Trichloroethene
October 2006
New Cassel Industrial Area Operable Unit 4
North Hempstead Westbury, NY

	< 0.25	0.25 to < 1	1 to < 5.0	5.0 and above
< 5	1. No further action	2. Take reasonable and practical actions to identify source(s) and reduce exposures	3. Take reasonable and practical actions to identify source(s) and reduce exposures	4. Take reasonable and practical actions to identify source(s) and reduce exposures
5 to < 50	5. No further action	6. MONITOR	7. MONITOR	8. MITIGATE
50 to < 250	9. MONITOR	10. MONITOR / MITIGATE	11. MITIGATE	12. MITIGATE
250 and above	13. MITIGATE	14. MITIGATE	15. MITIGATE	16. MITIGATE

Source:

New York State Department of Health 2006. *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Soil Vapor/Indoor Air Matrix 1. October.

Table 4-3
Soil Vapor/Indoor Air Matrix 2
Tetrachloroethene and 1,1,1-Trichloroethane
October 2006
New Cassel Industrial Area Operable Unit 4
North Hempstead Westbury, NY

	< 3	3 to < 30	30 to < 100	100 and above
< 100	1. No further action	2. Take reasonable and practical actions to identify source(s) and reduce exposures	3. Take reasonable and practical actions to identify source(s) and reduce exposures	4. Take reasonable and practical actions to identify source(s) and reduce exposures
100 to < 1,000	5. MONITOR	6. MONITOR / MITIGATE	7. MITIGATE	8. MITIGATE
1,000 and above	9. MITIGATE	10. MITIGATE	11. MITIGATE	12. MITIGATE

Source:

New York State Department of Health 2006. *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Soil Vapor/Indoor Air Matrix 2. October.

FIGURES



Legend

- New Cassel Industrial Area Sites
- Proposed Sampling Location

CDM



0 275 550
Feet

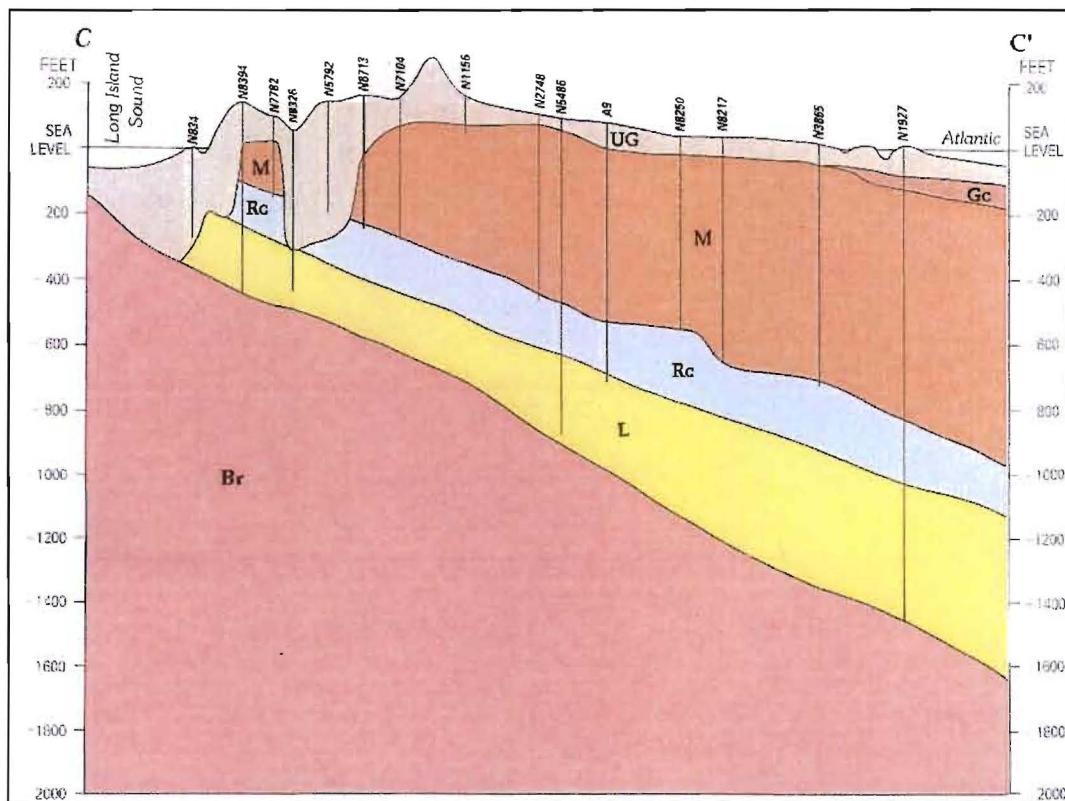
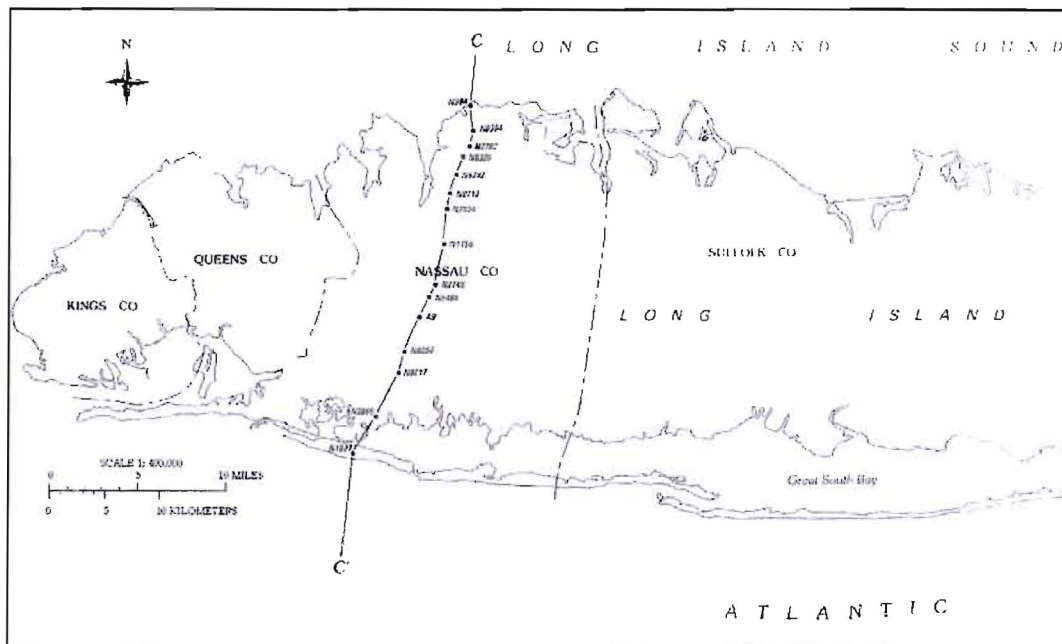
Figure 1-1
Site Location Map
New Cassel Industrial Area Sites
Residential and Public Properties
North Hempstead and Westbury, New York

System	Series	Age	Stratigraphic Unit	Hydrostratigraphic Unit
QUATERNARY	Holocene	Postglacial	Holocene (recent) deposits	Upper glacial aquifer
	Pleistocene	Wisconsin (upper Pleistocene)	Upper Pleistocene deposits	
			"20-foot" clay Upper Pleistocene deposits	
		unconformity		
	Sangamon	Gardiners Clay	Gardiners Clay	
unconformity				
	Pre-Sangamon	Jameco Gravel ¹	Jameco aquifer ¹	
	Pre-Sangamon		Reworked Matawan-Magothy channel deposits	Upper glacial or Magothy aquifer
unconformity				
CRETACEOUS	Upper Cretaceous		Monmouth Group	Monmouth greensand
		unconformity		
		Matawan Group-Magothy Formation, undifferentiated		Magothy aquifer
		unconformity		
		Raritan Formation	Unnamed clay member	Raritan confining unit
Lloyd Sand Member	Lloyd aquifer			
unconformity				
Paleozoic (or) Precambrian			Bedrock	Relatively impermeable bedrock

¹Present in Nassau County Only

adapted from Krulikas (1987)

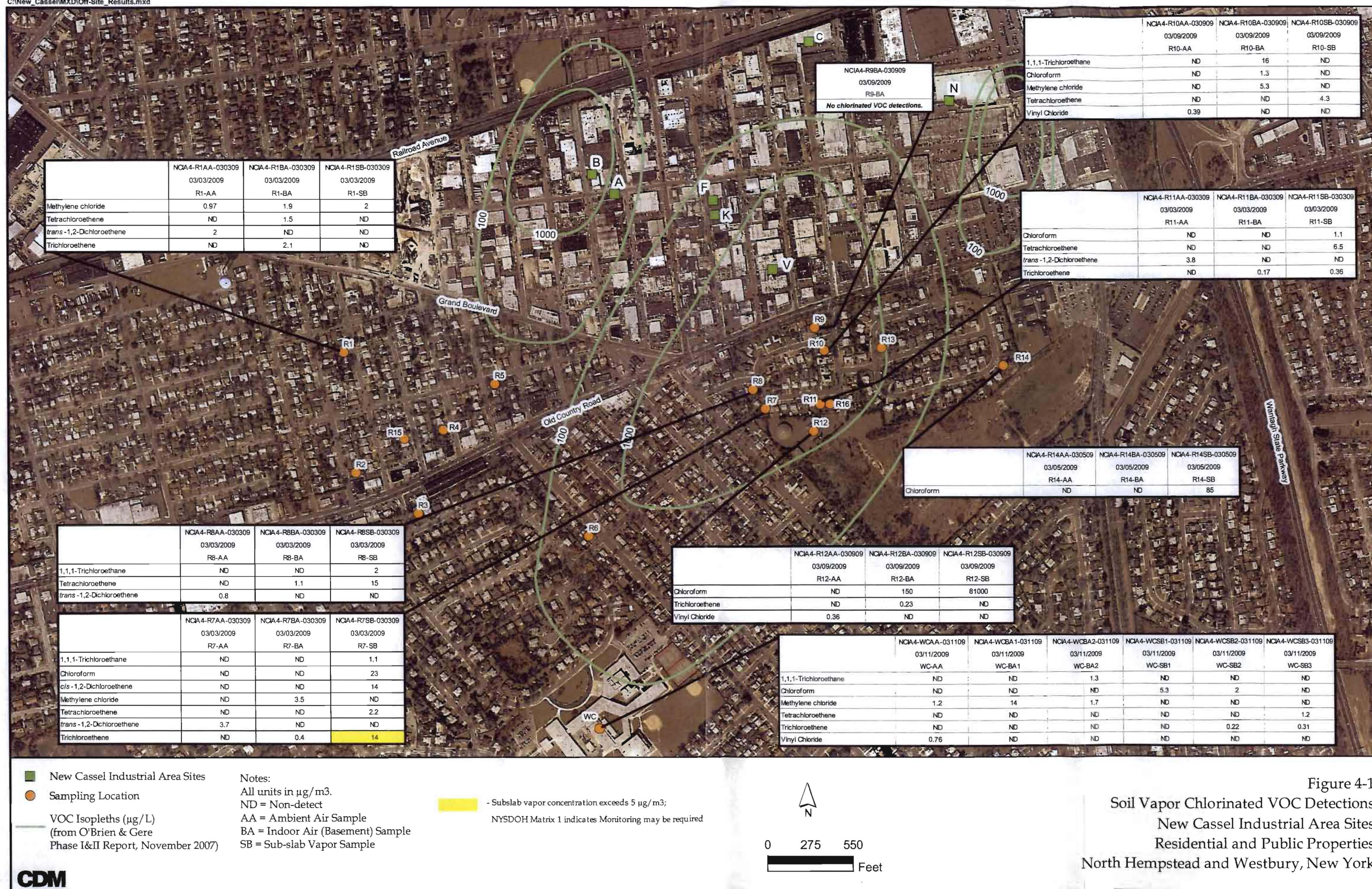
Figure 2-1
Generalized Regional Stratigraphy
New Cassel Industrial Area
North Hempstead, New York



(Br = bedrock; L = Lloyd; Rc = Raritan clay; M = Magothy; Gc = Gardiners clay; UG = upper glacial; from Smolensky et al, 1989).

Figure 2-2
Generalized North-South Cross Section through Nassau County
New Cassel Industrial Area
North Hempstead, New York

CDM



APPENDIX A
LETTER FOR UNSCHEDULED RESIDENT



125 Maiden Lane, 5th Floor
New York, New York 10038

Dear Current Resident,

The New York State Department of Environmental Conservation (NYSDEC), in cooperation with the New York State Department of Health (NYSDOH), is requesting your permission to sample your home for soil vapor intrusion related to the New Cassel Industrial Area (NCIA) sites' groundwater plume that is located south of the NCIA.

Thus far, several attempts were made to schedule an appointment for your residence. The field team will only be in the area to sample your home during the first and second week of March 2009. Please contact the Field Manager, Melissa Koberle, if you would like to participate. Her phone number is 610-739-0994.

Investigations to date indicate that groundwater and soil vapor from the NCIA sites has been contaminated with volatile organic compounds related to past disposal practices within the NCIA. Groundwater and soil vapor contamination has also been identified off-site south of the NCIA. The selected remedy for the Off-site Groundwater South of the New Cassel Industrial Area is currently being designed under the NYSDEC State Superfund program.

If you have any questions or concerns please feel free to contact either Mrs. Jacquelyn Nealon of NYSDOH at 1-800-458-1158, extension 27880 or Mr. Joseph Jones of NYSDEC at 518-402-9621.

Thanks in advance for your cooperation,

Melissa Koberle

Field Manager

APPENDIX B
FIELD INVESTIGATION PHOTOLOG

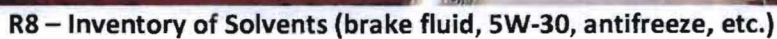
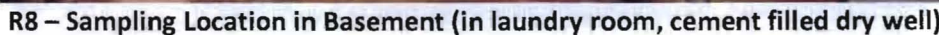
NCIA4 – Off-site Soil Vapor Investigation
Photolog



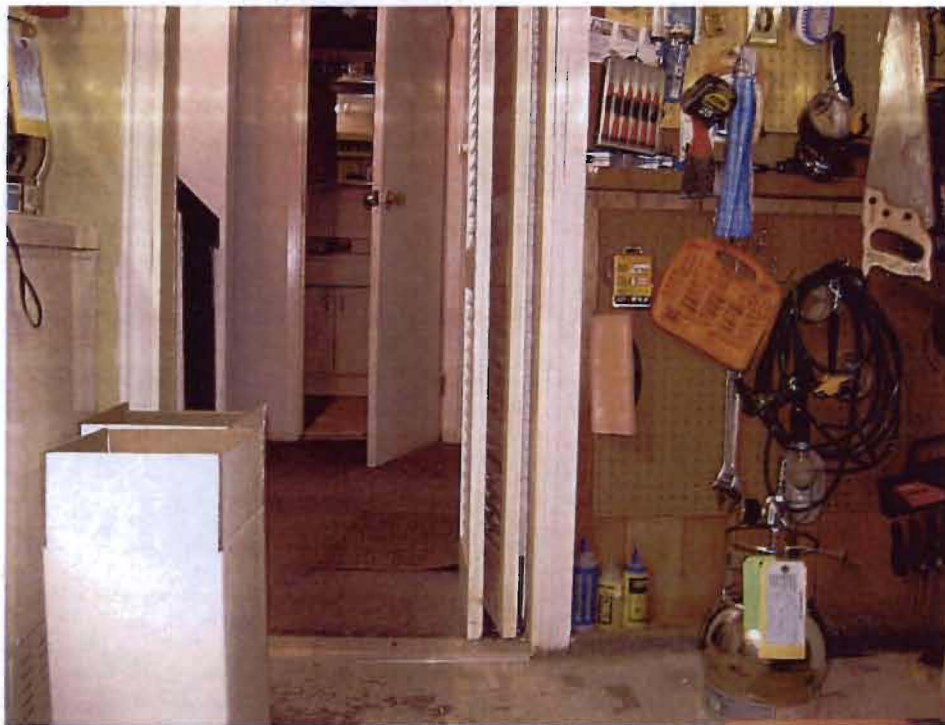
R8 – Inventory of Solvents (enamel, paint, etc.)



R8 – Inventory of Solvents (detergent, dust guster, bleach, etc.)



NCIA4 – Off-site Soil Vapor Investigation
Photolog



R11 – Sampling Location in Basement (laundry room and work room, floor drain behind oil burner)



R11 – Inventory of Solvents (pesticide, glue, odor neutralizer, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R1 – Inventory of Solvents (bleach, wood stain, etc.)



R1 – Inventory of Solvents (detergents, softner, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R1 – Sampling Location in Basement (near laundry room)



R1 – Inventory of Solvents (paint, finisher, detergent, latex cleaner, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R7 – Sampling Location in Basement (work bench and laundry room)



R7 – Inventory of Solvents (gloss, stains, chrome polish, paint, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R14 – Sump – Dry (storage room to left of sub-slab location)



R14 – Open Drain with Rocks – Dry (in same room to the left of sub-slab location)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**

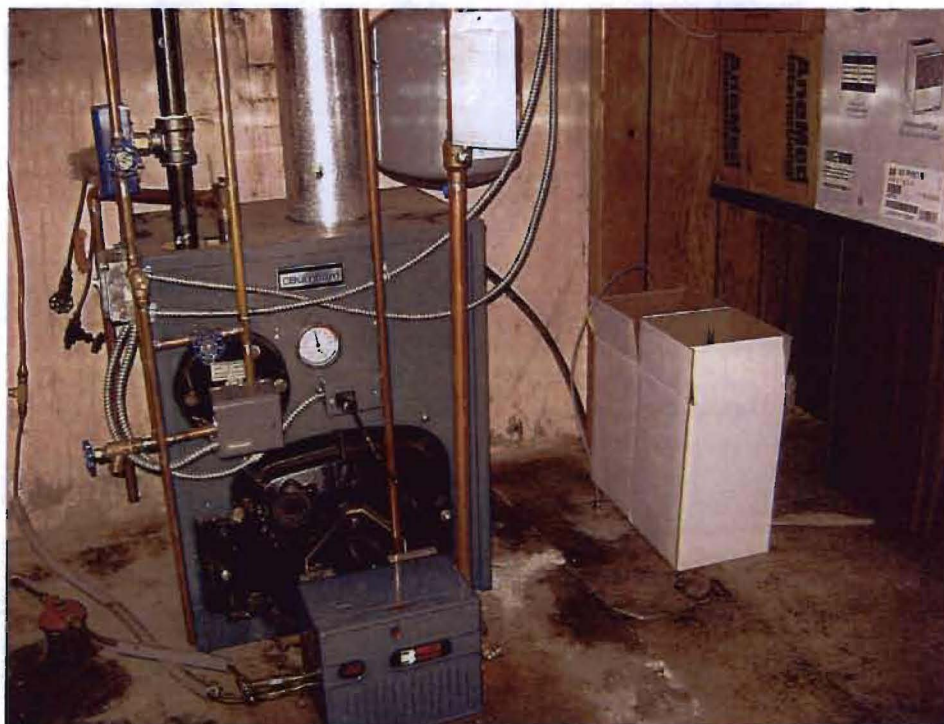


R14 – Inventory of Solvents (water-proofing, paint, primer, wallpaper stripper, etc.)

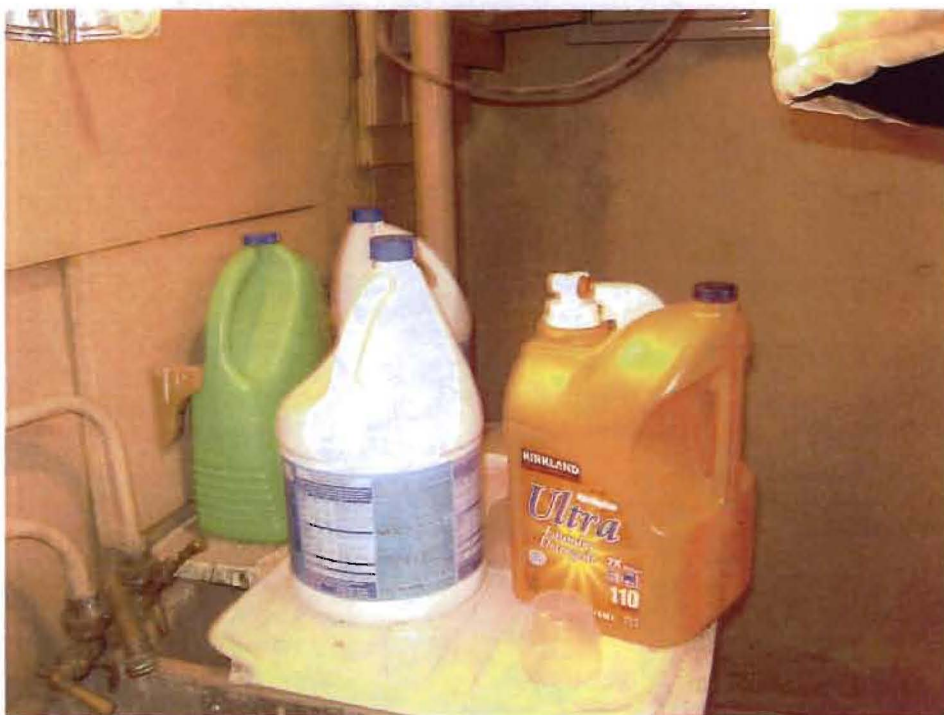


R14 – Open Floor - Dirt (storage room to the left of sub-slab location)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R14 – Sampling Location in Basement (storage and laundry room)



R14 – Inventory of Solvents (detergent, bleach, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R11 – Inventory of Solvents (tile sealer, caulk, joint compound, paint, etc.)



R11 – Inventory of Solvents (paints, glue, WD-40, concrete crack seal, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R9 – Inside Crawl Space (no slab, all dirt)



WC – Sampling Location SB1

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R9 – Crawl Space Underneath Residence (no basement)



R9 – Sampling Canister Inside Crawl Space

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R12 – Duplicate Setup



R12 – Basement (drain in adjacent room, generator (oil odor) and 55 gallon drum with chlorine on first floor)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



R10 – Sampling Location in Basement (laundry room adjacent, work room with paint, carpet protector, degreaser, stain remover, rust remover, oxi-cleaner, etc. in room other side of basement)



R12 – Sampling Location in Water Department Basement

NCIA4 – Off-site Soil Vapor Investigation Photolog



WC – Adjacent Room to SB1



WC – Adjacent Room to SB1 (motor oil, 20W-20, cigarette butts, etc.)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Storage Room Adjacent to SB1 (propylene glycol, floor finish, solventless cleaner, CaCl pellets, etc.)



WC – Adjacent Room to SB1 (powdered bleach)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**

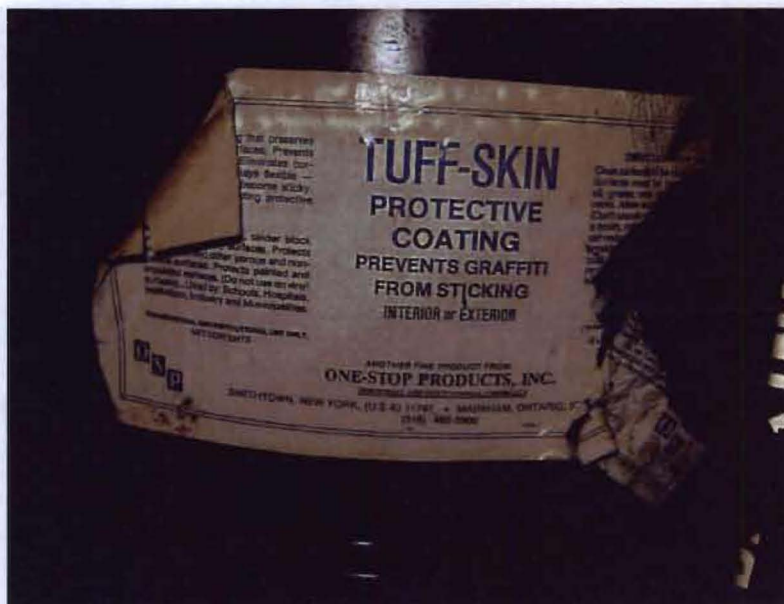


WC – 55 gallon drum – unknown (SB1)



WC – another 55 gallon drum – unknown (SB1)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Inventory of Solvents (SB1)



WC – Oil Tank (SB1)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Sampling Location of SB2 (white-out, disinfectant spray, and white board cleaner in side room)



WC – Sampling Location of SB3 (near ladies and mens locker room)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Sidewalks in Dirt Hallways (half of basement)



WC – Side Rooms of the Dirt Hallways (half of basement)

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Adjacent Room to SB1 (#140 super-shine all, solventless cleaner, etc.)



WC – Adjacent Room to SB1

**NCIA4 – Off-site Soil Vapor Investigation
Photolog**



WC – Adjacent Room to SB1 (55 gallon drums with transmission fluid label – look empty)



WC – Adjacent Room to SB1

APPENDIX C
NYSDOH INDOOR AIR SAMPLING QUESTIONNAIRE



NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: WC _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N

If yes, how many? _____

Other characteristics:

Number of floors 4 including bsmt Building age 1953

Is the building insulated? ☒ Y / N

How air tight? ☒ Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with _____
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y/N in boiler room
- k. Water in sump? Y/N not applicable

workout/weight room / lockers

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

hallways w/ dirt and cement sidewalks & rooms in bsmt with dirt

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply - note primary)

Hot air circulation
Space Heaters
Electric baseboard

Heat pump
Stream radiation
Wood stove

Hot water baseboard
Radiant floor
Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas
Electric
Wood

Fuel Oil
Propane
Coal

Kerosene
Solar

26,000 gall. outside custodian office

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y/N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement Workout room locker room storage Boiler Room
 1st Floor Classrooms
 2nd Floor Classrooms Library
 3rd Floor Library & Computer Lab
 4th Floor None

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage?

☒ Y ☐ N

b. Does the garage have a separate heating unit?

Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car)

Y / N / NA

Please specify _____

d. Has the building ever had a fire?

Y / ☒ N When? _____

e. Is a kerosene or unvented gas space heater present?

Y / N Where? _____

f. Is there a workshop or hobby/craft area?

☒ Y ☐ N Where & Type? Bsmt near SB-1

g. Is there smoking in the building?

☒ Y ☐ N How frequently? Saw cigarette butts in bsmt

h. Have cleaning products been used recently?

☒ Y ☐ N When & Type? _____

i. Have cosmetic products been used recently?

☒ Y ☐ N When & Type? highschool kids - bathroom

- j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____
- k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____
- l. Have air fresheners been used recently? Y / N When & Type? _____
- m. Is there a kitchen exhaust fan? Y / N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? Y / N If yes, where vented? _____
- o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / N When & Type? _____

Are there odors in the building? Y / N

If yes, please describe: paint

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

No

Yes, use dry-cleaning infrequently (monthly or less)

Unknown

Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: _____

Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: _____

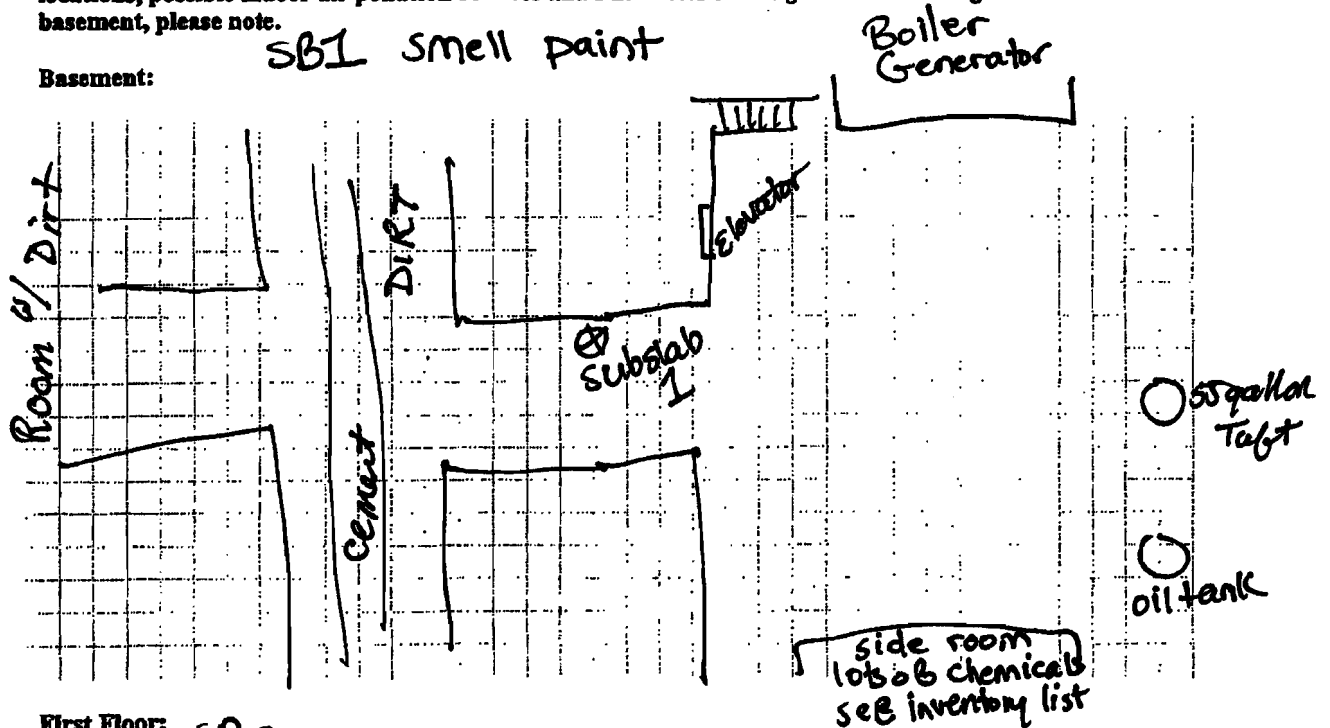
10. RELOCATION INFORMATION (for oil spill residential emergency)

- a. Provide reasons why relocation is recommended: _____
- b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel
- c. Responsibility for costs associated with reimbursement explained? Y / N
- d. Relocation package provided and explained to residents? Y / N

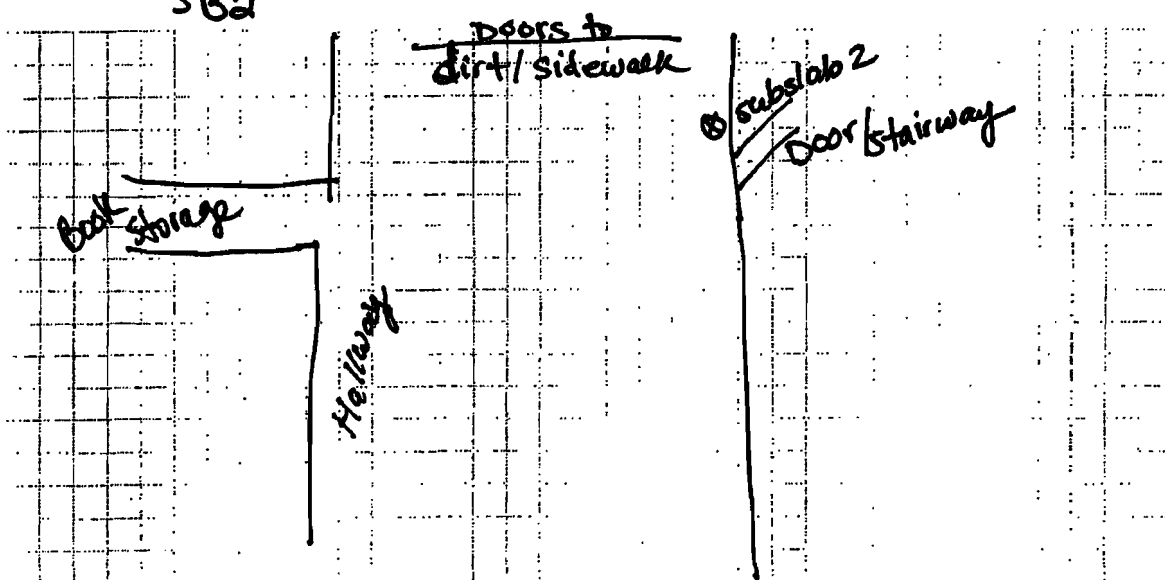
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



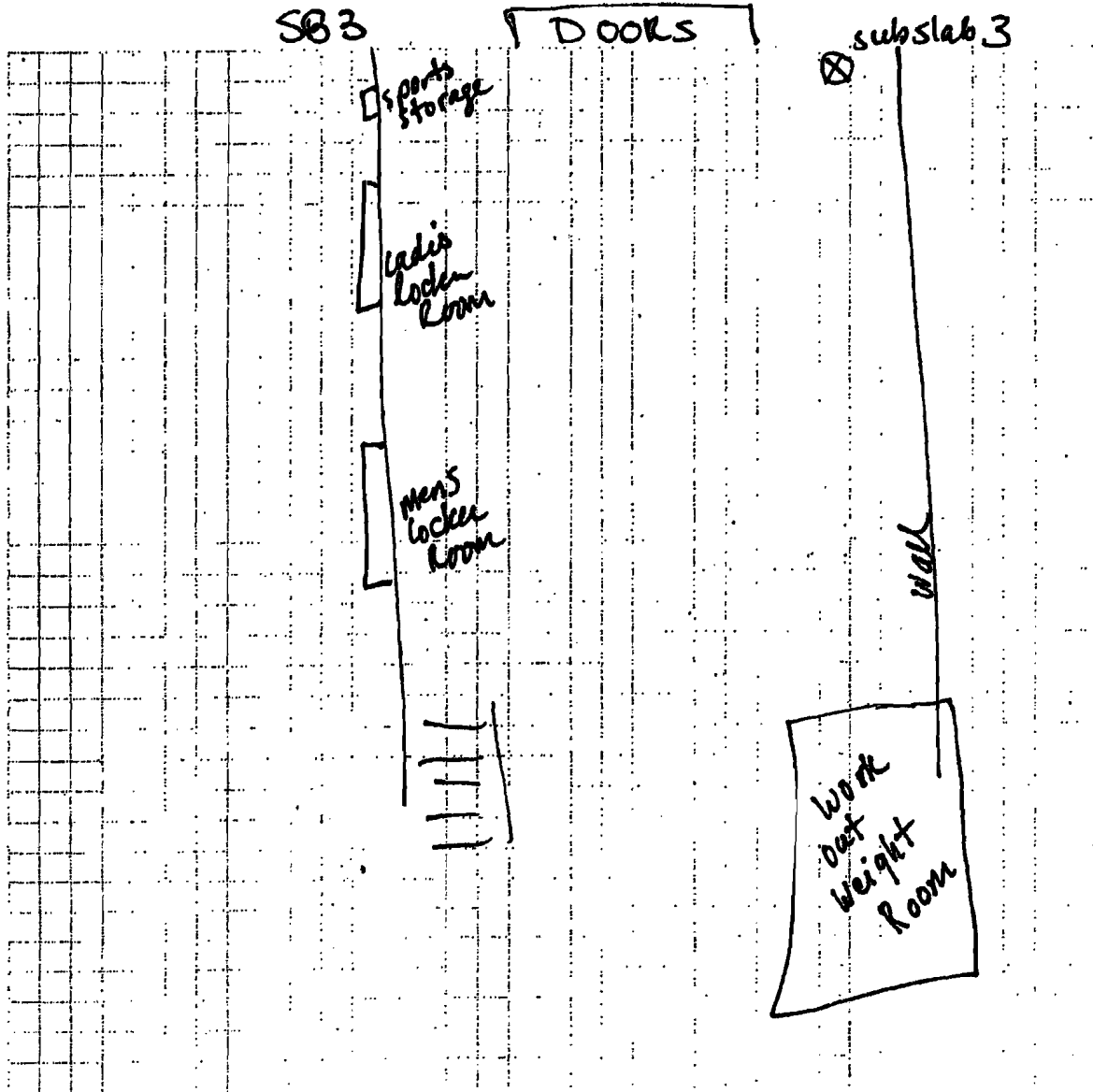
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



Ambient air in courtyard

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y/N
SB1	air compressor					
	(2) 55 gallon drums contents unknown good shape					
	55 gallon drum: Tuff-Skin protective coating					
	oil tank					
	tissues/ toilet paper/ hand towel boxes					
	in side room: solventless cleaner, #140 super-shine all					
	calcium chloride pellets, propylene glycol, floor finish,					
	55 gallon drums transmission fluid, motor oil, 20W-20					
	cigarette butts, powder bleach,					
SB2	white-out spray disinfectant whiteboard cleaner = all in					
	hallway just chairs, desks, boxes					
SB3	- nothing in hallway near ladies & mens locker room					

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

R1

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

If the property is residential, type? (Circle appropriate response)

<u>Ranch</u>	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 2 ^{Bst} _{1st} Building age ?

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with 75% carpet
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y / N
- k. Water in sump? Y / N not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

<u>Hot air circulation</u>	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler
		Other _____

The primary type of fuel used is:

Natural Gas	<u>Fuel Oil</u>	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement + V. room laundry

1st Floor Kitchen bedroom

2nd Floor _____

3rd Floor _____

4th Floor _____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- a. Is there an attached garage? Y ☒ N
- b. Does the garage have a separate heating unit? Y / N / ☒ NA
- c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / ☒ NA
Please specify _____
- d. Has the building ever had a fire? Y / ☒ N When? _____
- e. Is a kerosene or unvented gas space heater present? Y ☒ N Where? _____
- f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____
- g. Is there smoking in the building? Y ☒ N How frequently? _____
- h. Have cleaning products been used recently? ☒ Y / N When & Type? _____
- i. Have cosmetic products been used recently? ☒ Y / N When & Type? _____

- j. Has painting/staining been done in the last 6 months? ☒ Y / ☐ N Where & When? Wood Floor Stain
- k. Is there new carpet, drapes or other textiles? Y / ☒ N Where & When? _____
- l. Have air fresheners been used recently? Y / ☒ N When & Type? _____
- m. Is there a kitchen exhaust fan? Y / ☒ N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? ☒ Y / ☐ N If yes, where vented? _____
- o. Is there a clothes dryer? Y / ☒ N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / ☒ N When & Type? _____
- Are there odors in the building? Y / ☒ N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? Wood Flooring

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)
Yes, use dry-cleaning infrequently (monthly or less) ☒
Yes, work at a dry-cleaning service

No
Unknown

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: ☒ Public Water Drilled Well Driven Well Dug Well Other: _____
Sewage Disposal: ☒ Public Sewer Septic Tank Leach Field Dry Well Other: _____

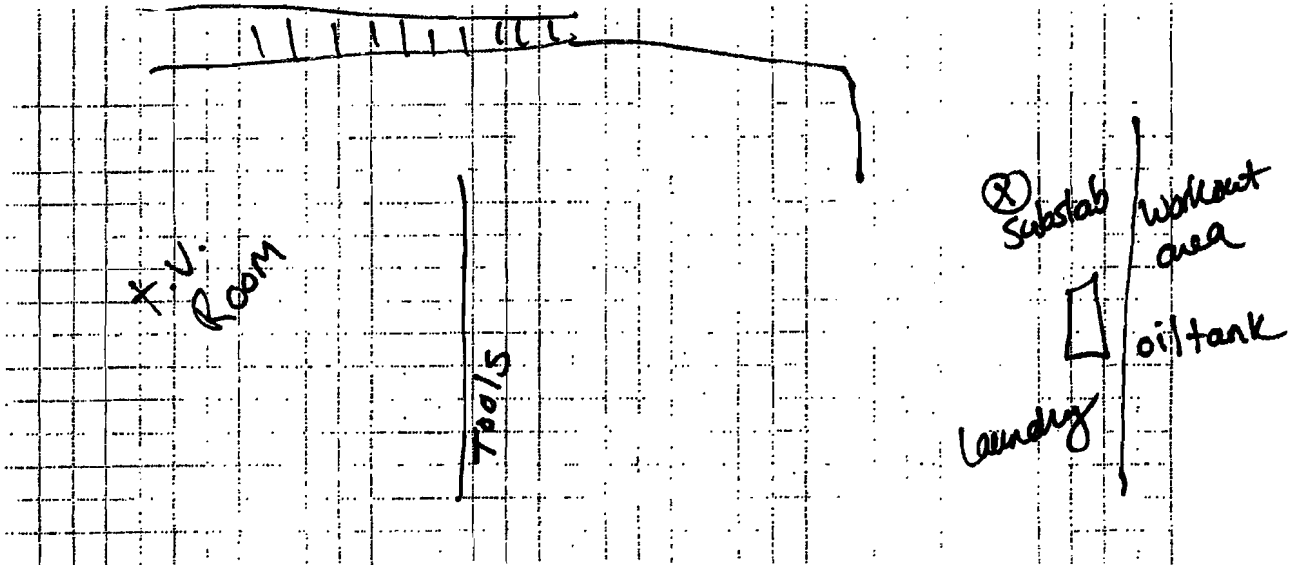
10. RELOCATION INFORMATION (for oil spill residential emergency)

- a. Provide reasons why relocation is recommended: _____
- b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel
- c. Responsibility for costs associated with reimbursement explained? Y / N
- d. Relocation package provided and explained to residents? Y / N

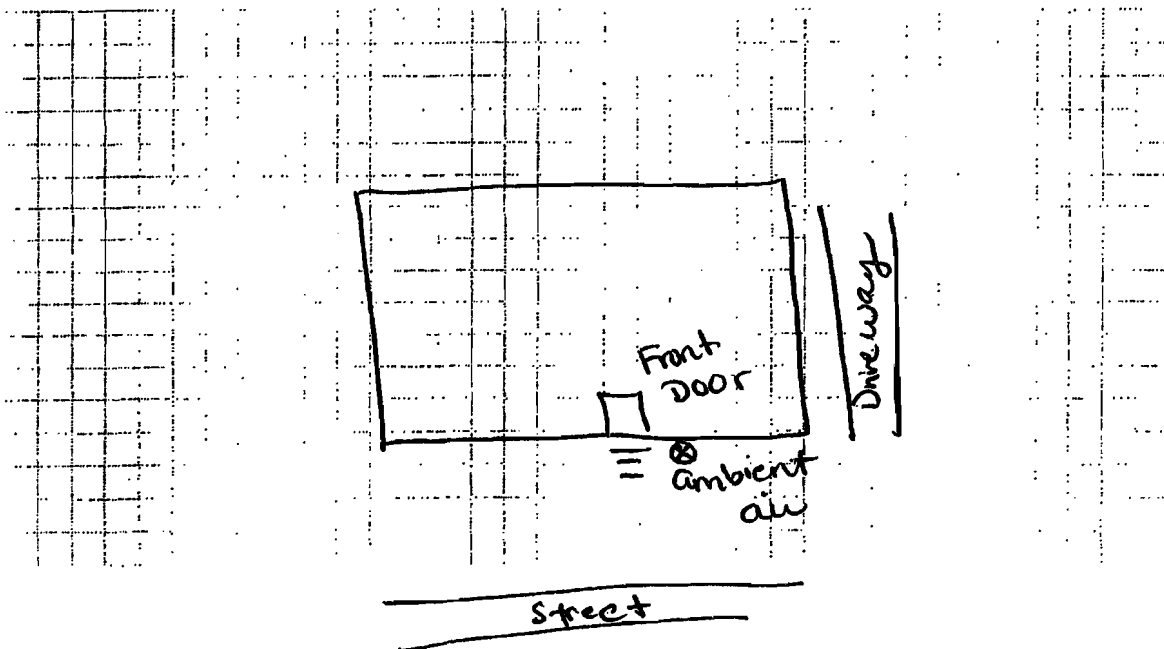
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



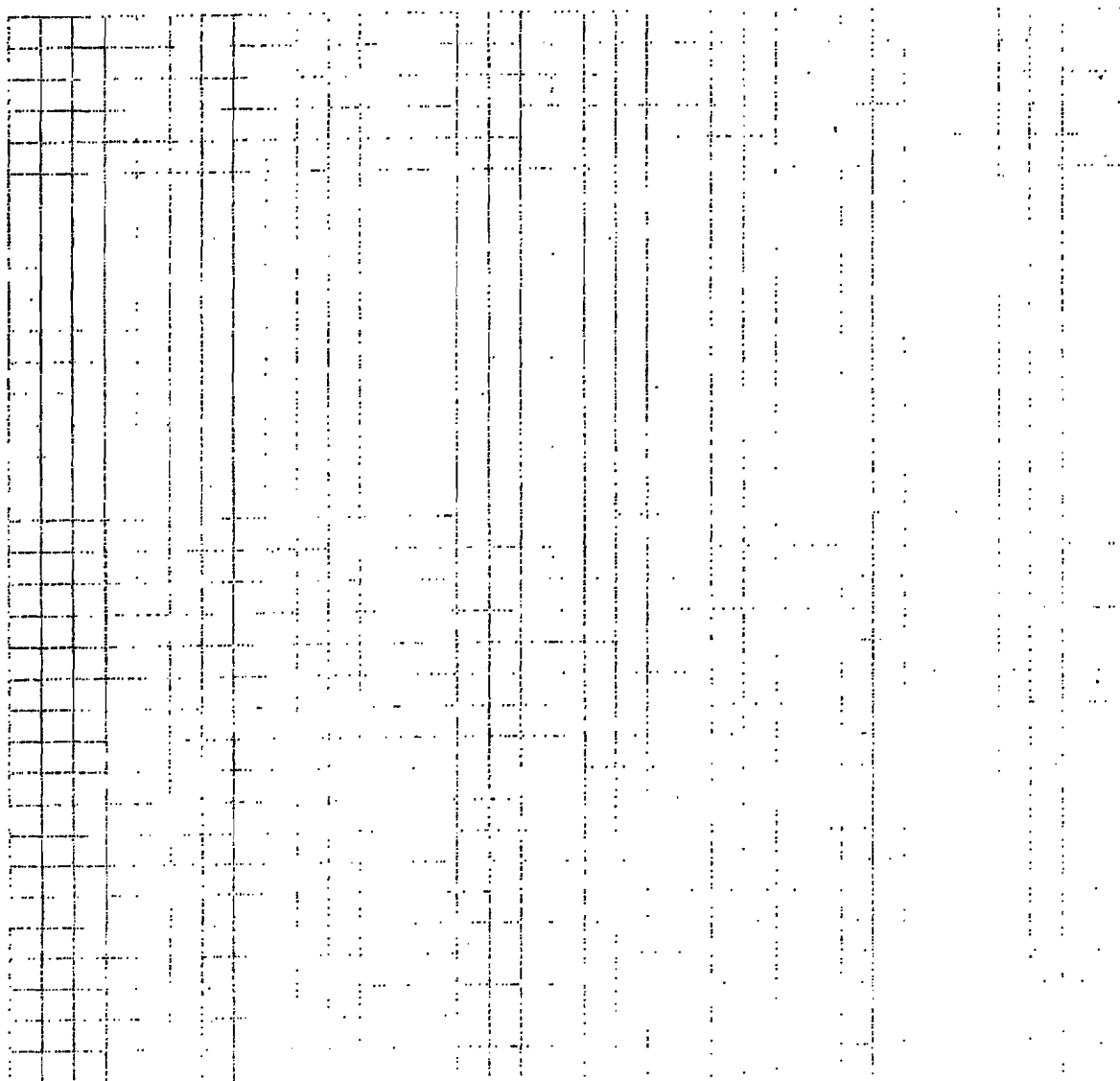
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

[illegible]

* Describe the condition of the product containers as **Unopened (UO)**, **Used (U)**, or **Deteriorated (D)**

**** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.**

**NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

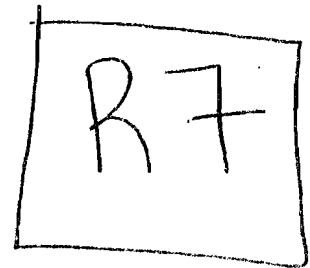
3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____



If the property is residential, type? (Circle appropriate response)

<u>Ranch</u>	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 2 Building age _____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with Carpet 97%
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y / N
- k. Water in sump? Y / N not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply - note primary)

<u>Hot air circulation</u>	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas	<u>Fuel Oil</u>	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: oil

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y/N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement Laundry, work station

1st Floor bedroom & Kitchen

2nd Floor _____

3rd Floor _____

4th Floor _____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- a. Is there an attached garage? ☒ Y ☐ N
- b. Does the garage have a separate heating unit? Y / ☒ N / NA
- c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) ☒ Y / ☐ N / NA
Please specify _____
- d. Has the building ever had a fire? Y / ☒ N When? _____
- e. Is a kerosene or unvented gas space heater present? Y / ☒ N Where? _____
- f. Is there a workshop or hobby/craft area? ☒ Y / ☐ N Where & Type? _____
- g. Is there smoking in the building? Y / ☒ N How frequently? _____
- h. Have cleaning products been used recently? ☒ Y / ☐ N When & Type? _____
- i. Have cosmetic products been used recently? ☒ Y / ☐ N When & Type? _____

- j. Has painting/staining been done in the last 6 months? Y ☒ N Where & When? _____
- k. Is there new carpet, drapes or other textiles? Y ☒ N Where & When? _____
- l. Have air fresheners been used recently? Y ☒ N When & Type? _____
- m. Is there a kitchen exhaust fan? ☒ Y / N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? Y ☒ N If yes, where vented? _____
- o. Is there a clothes dryer? ☒ Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? ☒ Y / N When & Type? Dumma

Are there odors in the building?

Y ☒ N

If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work?

Y ☒ N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

Yes, use dry-cleaning infrequently (monthly or less)

Yes, work at a dry-cleaning service

☒ No

Unknown

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: ☒ Public Water Drilled Well Driven Well Dug Well Other: _____

Sewage Disposal: ☒ Public Sewer Septic Tank Leach Field Dry Well Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

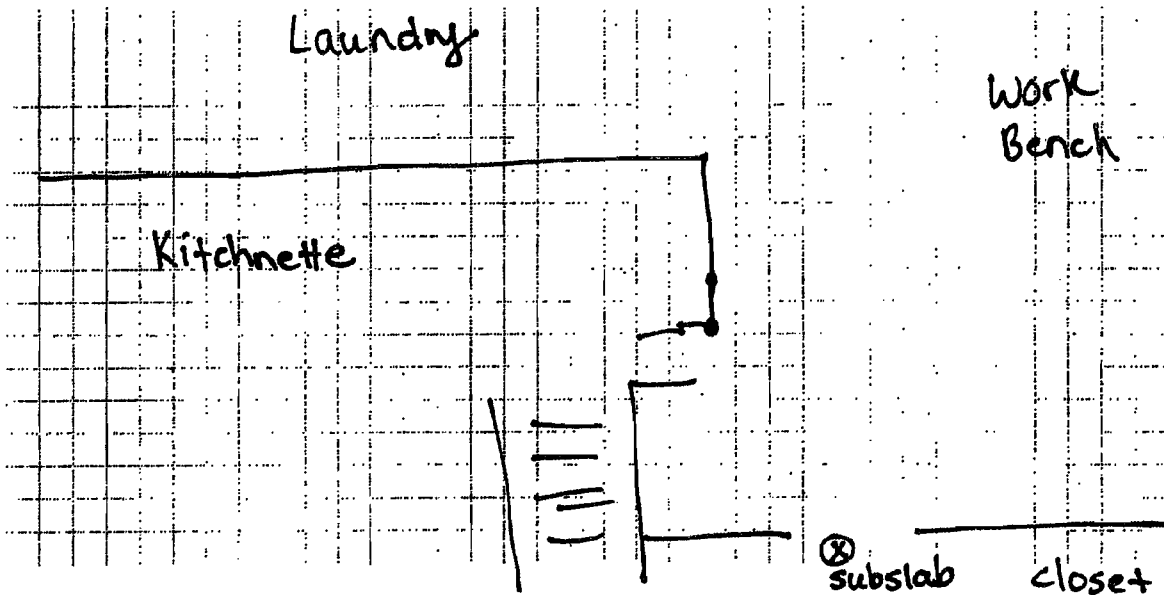
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

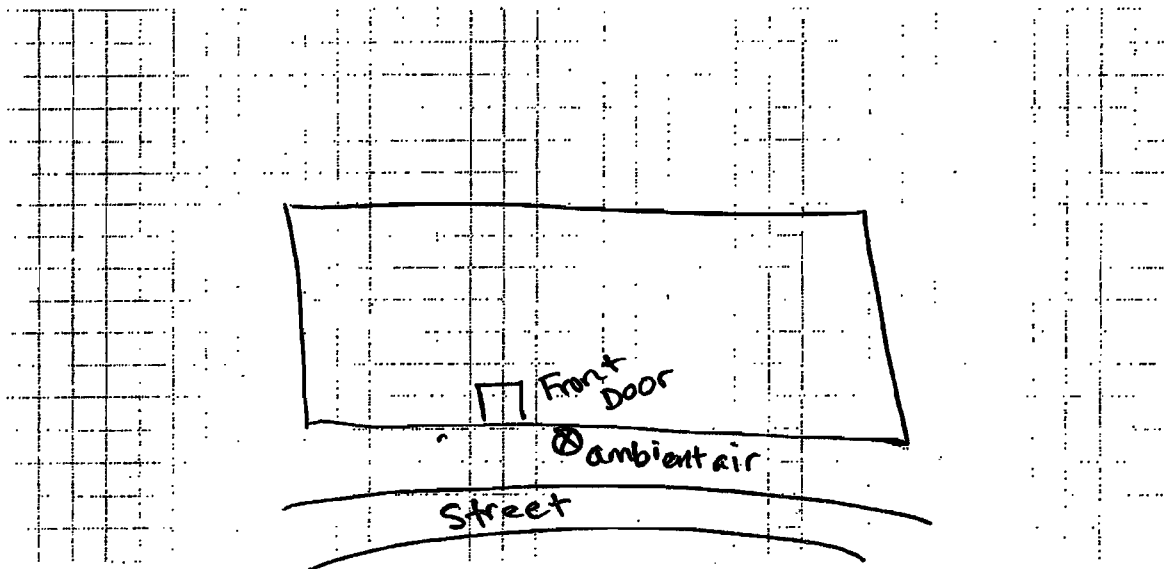
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



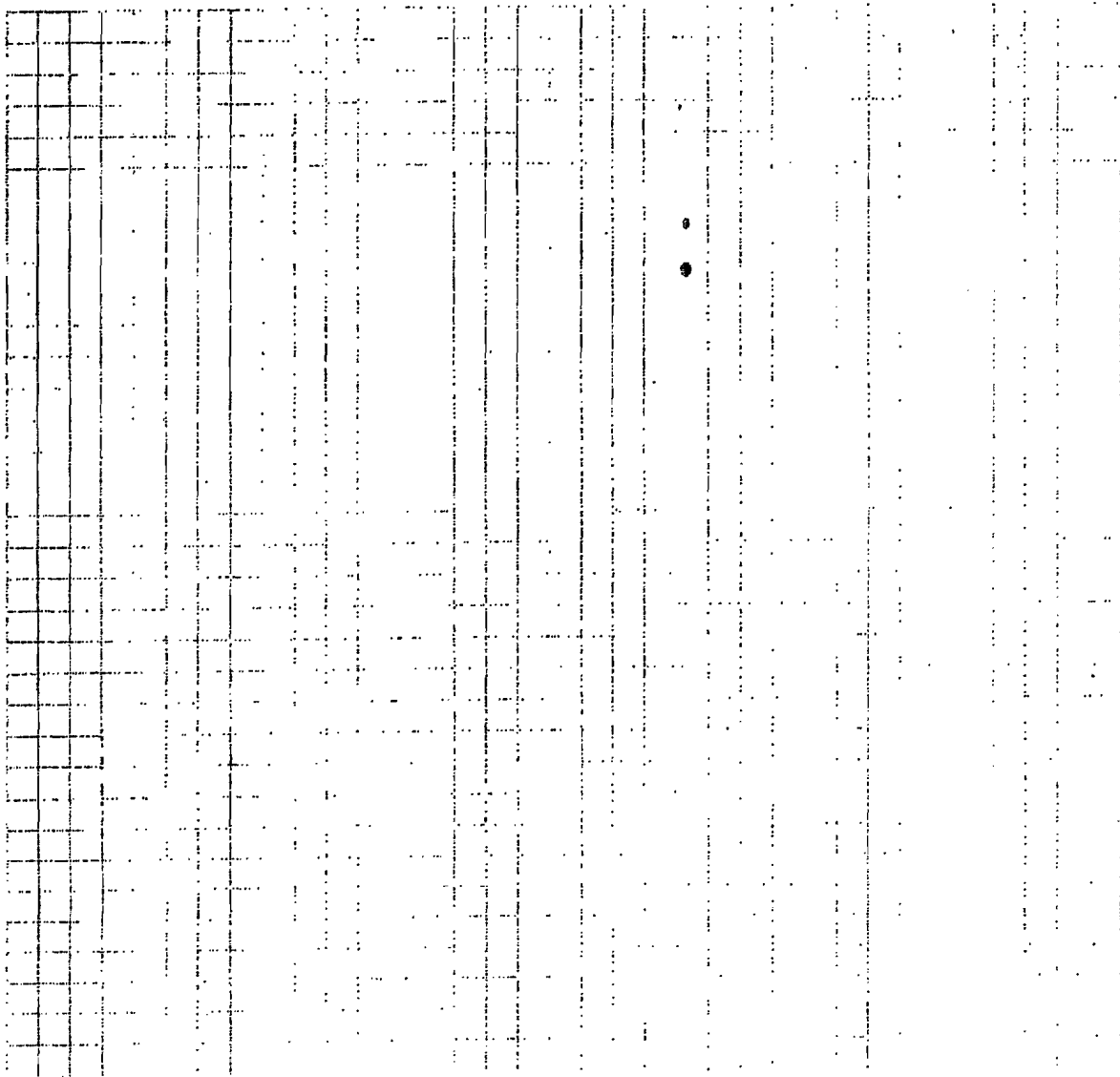
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

[illegible]

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

**** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.**

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INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
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This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

R8

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch

Raised Ranch

Cape Cod

Duplex

Modular

2-Family

Split Level

Contemporary

Apartment House

Log Home

3-Family

Colonial

Mobile Home

Townhouses/Condos

Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N

If yes, how many? _____

Other characteristics:

Number of floors

bsmt
1st Fl. (2)

Building age

@
1958

Is the building insulated? Y / N

How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with tile carpet 9506
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y N
- k. Water in sump? Y N not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

drywell cemented shut

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply - note primary)

<u>Hot air circulation</u>	Heat pump	Hot water baseboard
<u>Space Heaters</u>	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas	<u>Fuel Oil</u>	Kerosene
Electric	<u>Propane</u>	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement laundry tv room

1st Floor Kitchen bedroom

2nd Floor _____

3rd Floor _____

4th Floor _____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- a. Is there an attached garage? Y (N) 3rd Bedroom
- b. Does the garage have a separate heating unit? Y / N (NA)
- c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N (NA)
Please specify _____
- d. Has the building ever had a fire? Y (N) When? _____
- e. Is a kerosene or unvented gas space heater present? Y (N) Where? _____
- f. Is there a workshop or hobby/craft area? (Y) N Where & Type? Bsmt
- g. Is there smoking in the building? Y (N) How frequently? _____
- h. Have cleaning products been used recently? (Y) N When & Type? _____
- i. Have cosmetic products been used recently? (Y) N When & Type? _____

- j. Has painting/staining been done in the last 6 months? ☒ Y / N Where & When? Bsmt
- k. Is there new carpet, drapes or other textiles? Y / ☒ N Where & When? _____
- l. Have air fresheners been used recently? ☒ Y / N When & Type? _____
- m. Is there a kitchen exhaust fan? Y / ☒ N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? ☒ Y / N If yes, where vented? _____
- o. Is there a clothes dryer? ☒ Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / N When & Type? _____

Are there odors in the building?
If yes, please describe: _____

Y / ☒ N

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work?

Y / ☒ N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)
Yes, use dry-cleaning infrequently (monthly or less)
Yes, work at a dry-cleaning service

No
Unknown

Is there a radon mitigation system for the building/structure? Y / ☒ N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: _____
Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: _____

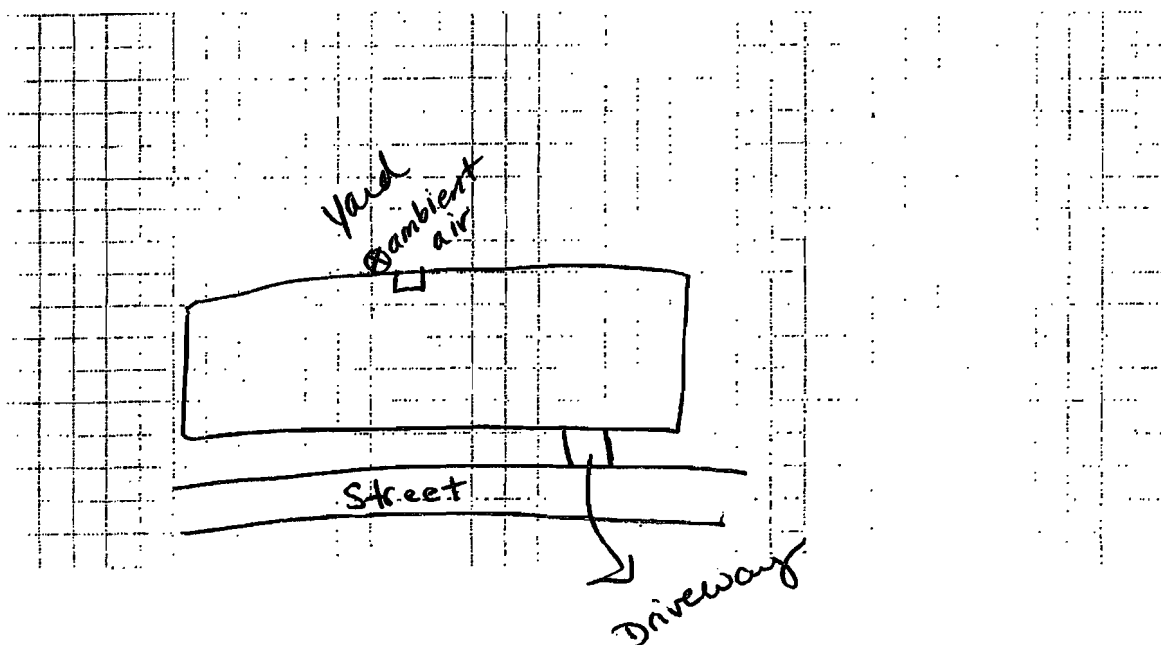
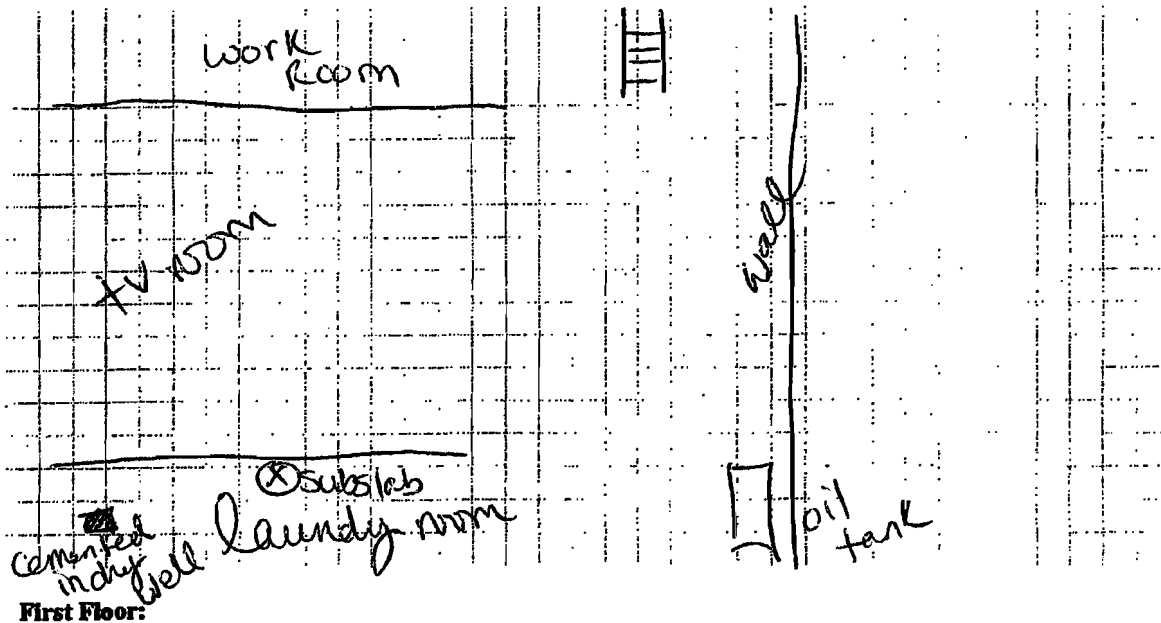
10. RELOCATION INFORMATION (for oil spill residential emergency)

- a. Provide reasons why relocation is recommended: _____
- b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel
- c. Responsibility for costs associated with reimbursement explained? Y / N
- d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

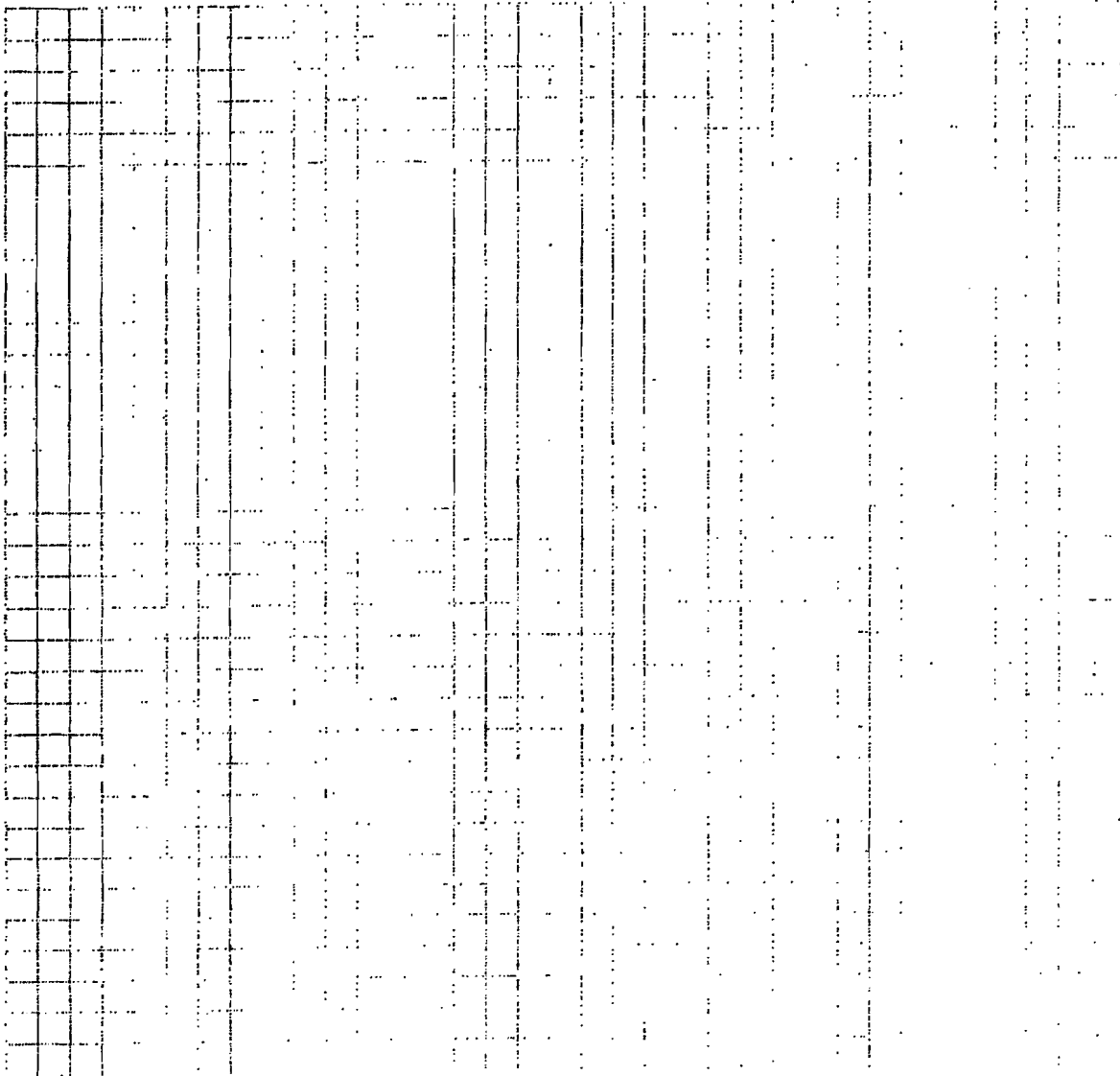
Basement:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y/N
	Oxy clean					
	bleach					
	laundry detergent					
	softener					
	Dust Gaster					
	Enamel					
	Paint					
	Brake fluid					
	5W-30					
	10W-30					
	antifreeze					
	Joint Compd					
	Spot Remover					

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

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CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

R10

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	<u>Colonial</u>
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 3 w/ basement Building age 1952

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with Carpet & tile
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y/N Y *taken out*
- k. Water in sump? Y/N/not applicable not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

<u>Hot air circulation</u>	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas	<u>Fuel Oil</u>	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present?

Y/N ☒ N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., family room, bedroom, laundry, workshop, storage)

Basement

family room Storage

1st Floor

Kitchen living room bedroom

2nd Floor

" " "

3rd Floor

4th Floor

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage?

Y/N ☒ N

b. Does the garage have a separate heating unit?

Y/N/NA ☒ NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car)

Y/N/NA ☒ NA

Please specify _____

d. Has the building ever had a fire?

Y ☒ N When? _____

e. Is a kerosene or unvented gas space heater present?

Y ☒ N Where? _____

f. Is there a workshop or hobby/craft area?

☒ Y N Where & Type? _____

g. Is there smoking in the building?

Y ☒ N How frequently? _____

h. Have cleaning products been used recently?

☒ Y N When & Type? _____

i. Have cosmetic products been used recently?

☒ Y N When & Type? _____

- j. Has painting/staining been done in the last 6 months? ☒ Y / N Where & When? upstairs
- k. Is there new carpet, drapes or other textiles? ☒ Y / N Where & When? upstairs
- l. Have air fresheners been used recently? ☒ Y / N When & Type? _____
- m. Is there a kitchen exhaust fan? Y / ☒ N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? ☒ Y / N If yes, where vented? _____
- o. Is there a clothes dryer? ☒ Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / ☒ N When & Type? _____
- Are there odors in the building? Y / ☒ N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? adhesives - carpet store

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) ☒ No
Yes, use dry-cleaning infrequently (monthly or less) ☒ Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / ☒ N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: _____
Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: _____

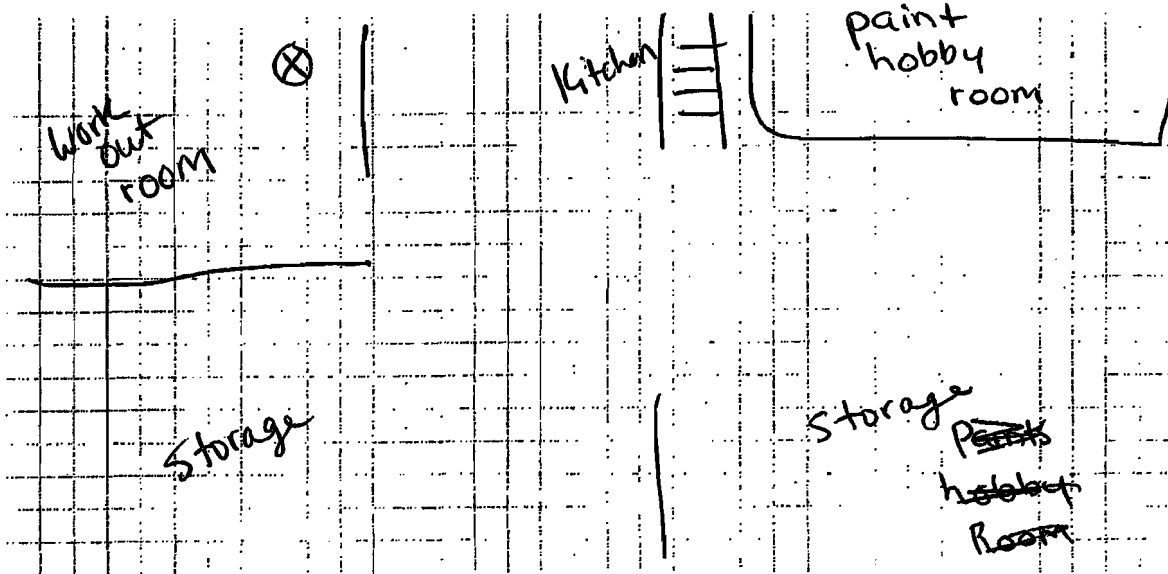
10. RELOCATION INFORMATION (for oil spill residential emergency)

- a. Provide reasons why relocation is recommended: _____
- b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel
- c. Responsibility for costs associated with reimbursement explained? Y / N
- d. Relocation package provided and explained to residents? Y / N

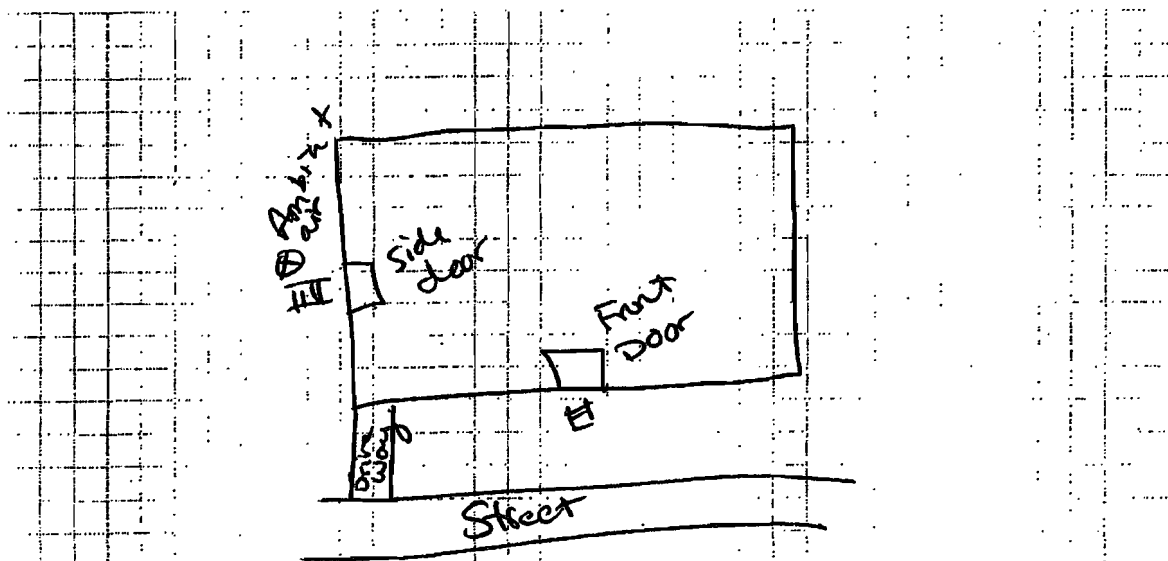
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



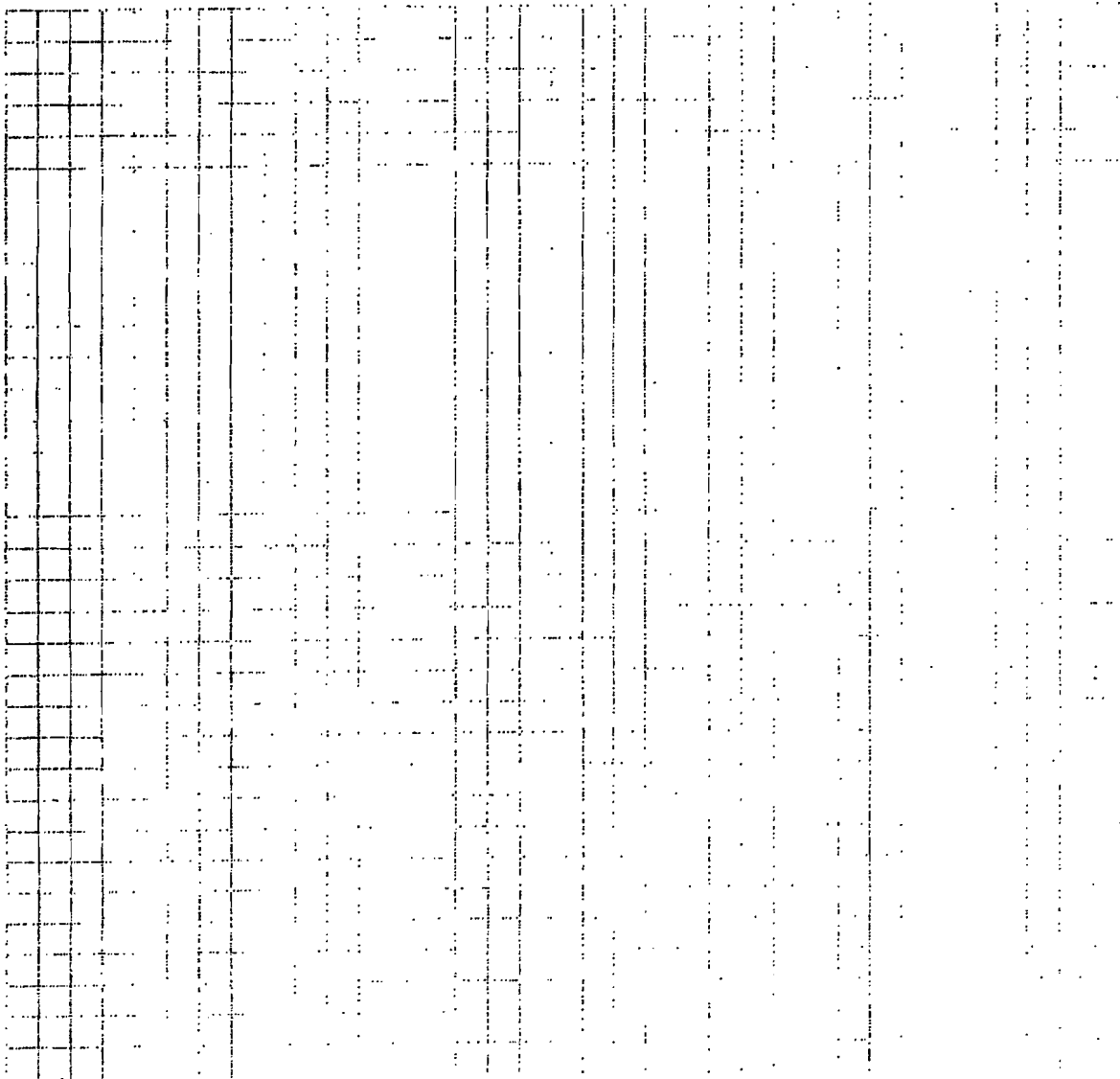
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



List specific products found in the residence that have the potential to affect indoor air quality.

[illegible]

**** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.**

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: ☒ Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

☒ Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

R11

→ If the property is residential, type? (Circle appropriate response)

Ranch

Raised Ranch

Cape Cod

Duplex

Modular

2-Family

Split Level

Contemporary

Apartment House

Log Home

3-Family

Colonial

Mobile Home

Townhouses/Condos

Other: _____

If multiple units, how many? 2 fl.

If the property is commercial, type?

Business Type(s) N

Does it include residences (i.e., multi-use)? Y / N

If yes, how many? _____

→ Other characteristics:

Number of floors

2 (bsmt + FF)

Building age

1954

Is the building insulated? Y / N

How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

N/A

open drain in bsmt
near wall and oil burner

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with carpet 95%
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y/N floor drain
- k. Water in sump? Y/N/ not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

floor drain see pg. 2

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation
Space Heaters
Electric baseboard

Heat pump
Steam radiation
Wood stove

Hot water baseboard
Radiant floor
Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas
Electric
Wood

Fuel Oil
Propane
Coal

Kerosene
Solar

Domestic hot water tank fueled by: oilBoiler/furnace located in: Basement Outdoors Main Floor Other _____Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y/☒N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

→ 7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement t.v. room

1st Floor Kitchen / living rm. / 2 bedroom

2nd Floor _____

3rd Floor _____

4th Floor _____

→ 8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- a. Is there an attached garage? ☒Y ☐N
- b. Does the garage have a separate heating unit? Y/☒N/NA
- c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y/☒N/NA
Please specify _____
- d. Has the building ever had a fire? Y/☒N When? _____
- e. Is a kerosene or unvented gas space heater present? Y/☒N Where? _____
- f. Is there a workshop or hobby/craft area? ☒Y/☐N Where & Type? Bsmt
- g. Is there smoking in the building? Y/☒N How frequently? _____
- h. Have cleaning products been used recently? ☒Y/☐N When & Type? _____
- i. Have cosmetic products been used recently? ☒Y/☐N When & Type? _____

j. Has painting/staining been done in the last 6 months?

☒ Y / ☐ N

Where & When?

*Week & half
primer bsmt hallway*

k. Is there new carpet, drapes or other textiles?

Y / ☒ N

Where & When?

l. Have air fresheners been used recently?

Y / ☒ N

When & Type?

m. Is there a kitchen exhaust fan?

☒ Y / ☐ N

If yes, where vented?

n. Is there a bathroom exhaust fan?

☒ Y / ☐ N

If yes, where vented?

o. Is there a clothes dryer?

☒ Y / ☐ N

If yes, is it vented outside? Y / N

p. Has there been a pesticide application?

Y / ☒ N

When & Type?

Are there odors in the building?

Y / ☒ N

If yes, please describe:

Do any of the building occupants use solvents at work?

Y / ☒ N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used?

If yes, are their clothes washed at work?

Y / ☒ N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

Yes, use dry-cleaning infrequently (monthly or less)

Yes, work at a dry-cleaning service

No

Unknown

no dry cleaning

Is there a radon mitigation system for the building/structure? Y / N Date of Installation:

Is the system active or passive?

Active/Passive

9. WATER AND SEWAGE

Water Supply:

☒ Public Water

Drilled Well

Driven Well

Dug Well

Other: _____

Sewage Disposal:

☒ Public Sewer

Septic Tank

Leach Field

Dry Well

Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended:

b. Residents choose to: remain in home

relocate to friends/family

relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained?

Y / N

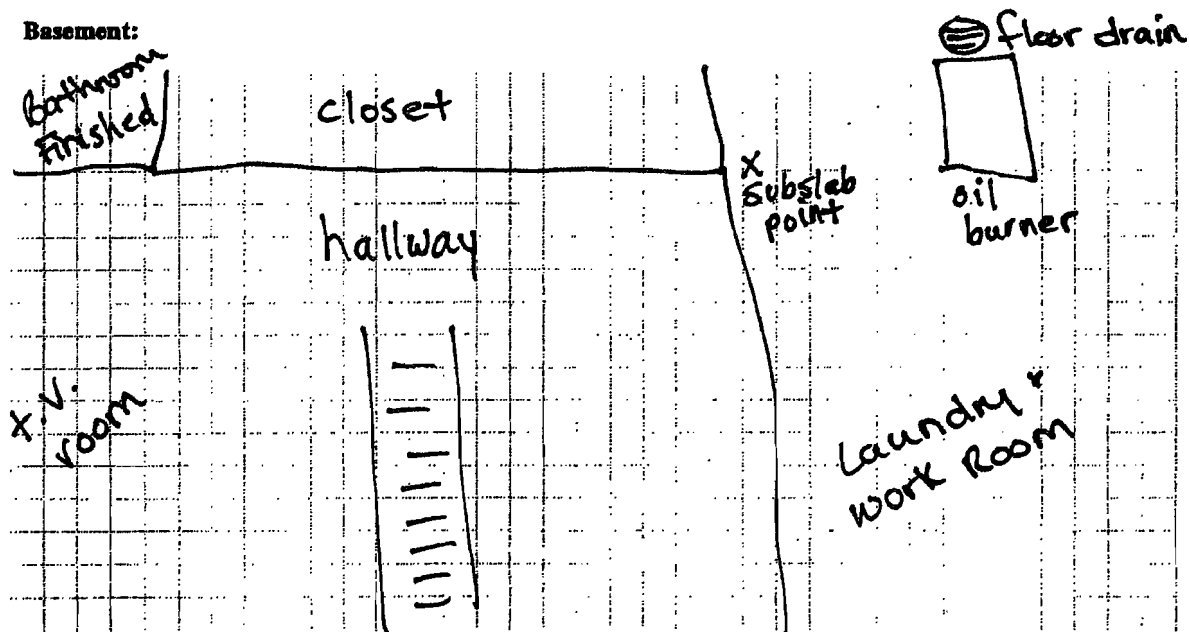
d. Relocation package provided and explained to residents?

Y / N

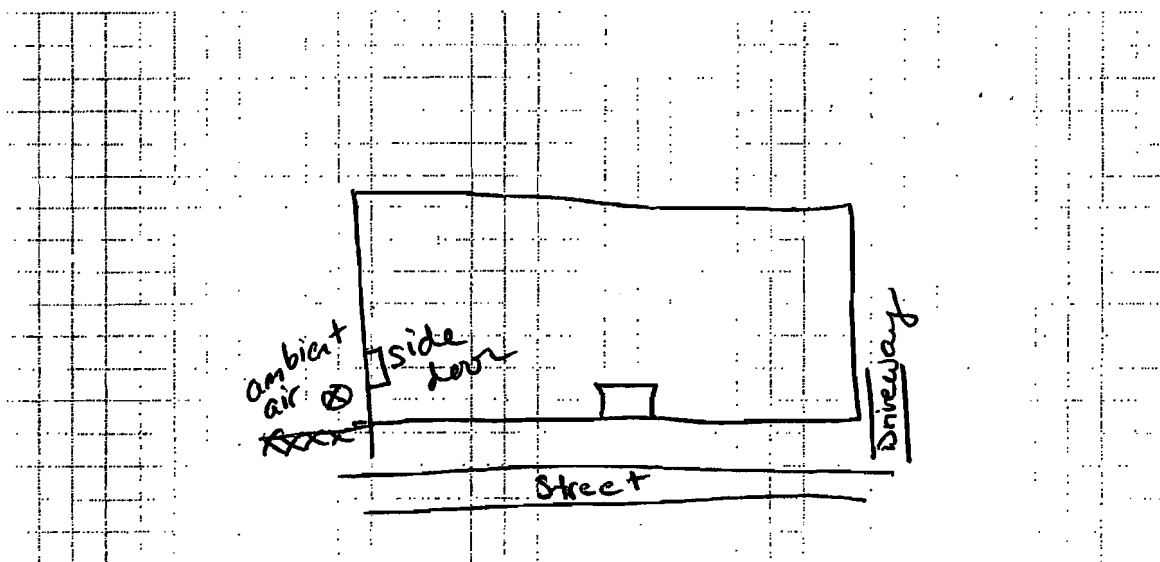
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



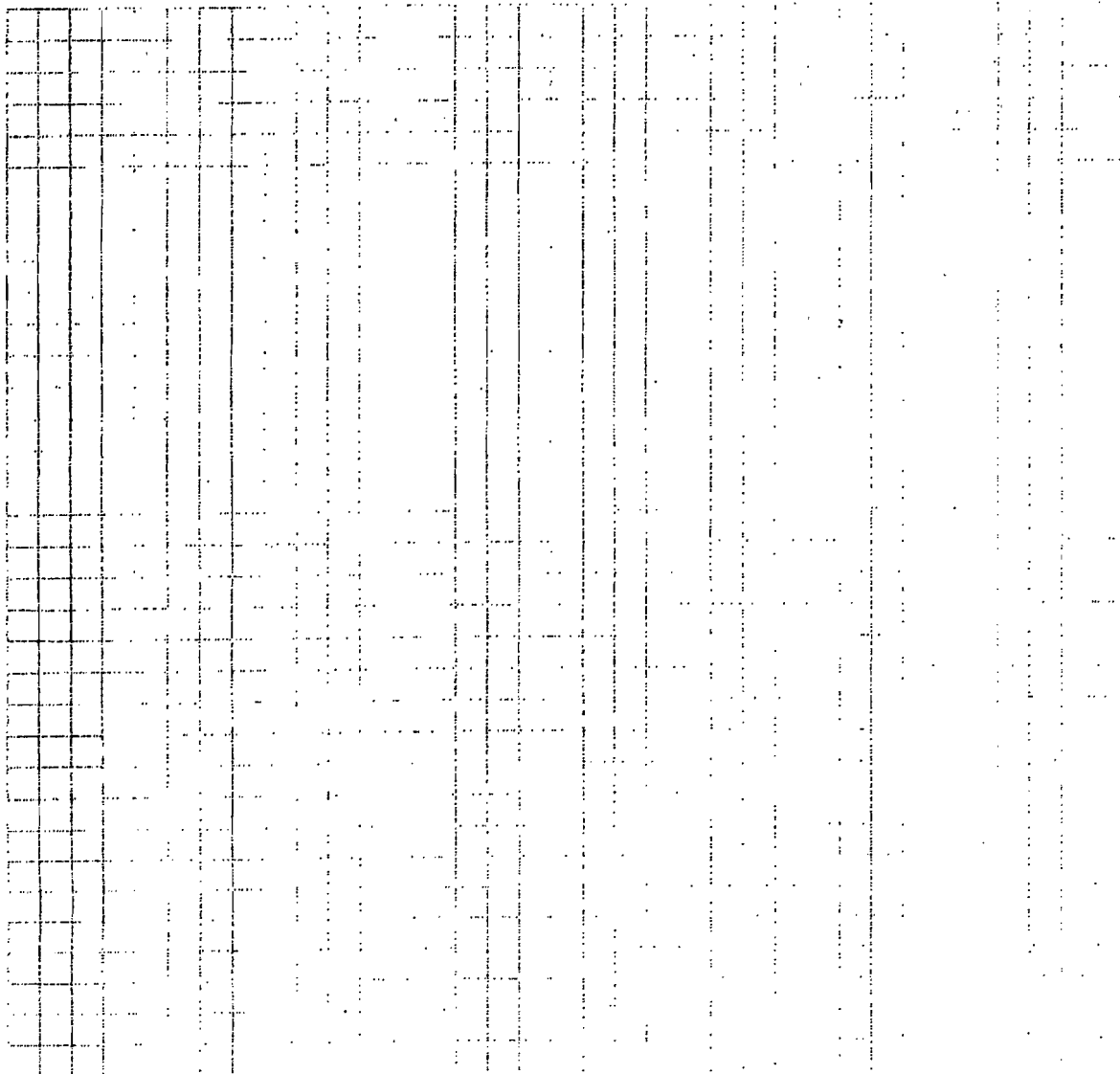
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y/N
	Elmer Glue		GOOD			
	Odor Neutralizer Spray					
	Farm + Implement		KRYLON			
	Grout + Tile Sealer					
	Rust - Protective Enamel					
	Paints					
	Caulk					
	Joint Compound					
	Latex Enamel					
	Silicon Rubber Sealant					
	Finish					
	Gorilla Glue					
	Clear Glass					
	WD-40					
	Gray Concrete Crack Seal					
	Cleaners Bathroom Cabinet					

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use

Other: Water Department
Town of Hempstead

R12

If the property is residential, type? (Circle appropriate response)

Ranch
Raised Ranch
Cape Cod
Duplex
Modular

2-Family
Split Level
Contemporary
Apartment House
Log Home

3-Family
Colonial
Mobile Home
Townhouses/Condos
Other: One ci bldg.

basement w/multiple levels

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) Water Department

Does it include residences (i.e., multi-use)? Y / N

If yes, how many? _____

Other characteristics:

Number of floors 1

Building age ?

Is the building insulated? Y / N

How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with _____
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished *Wet in sumps*
- j. Sump present? Y N
- k. Water in sump? Y N / not applicable

Basement/Lowest level depth below grade: 10 (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Sump & dry well

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation Heat pump Hot water baseboard
 Space Heaters Stream radiation Radiant floor
 Electric baseboard Wood stove Outdoor wood boiler Other _____

The primary type of fuel used is:

Natural Gas Fuel Oil Kerosene
 Electric Propane Solar
 Wood Coal

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present?

Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement	
1 st Floor	
2 nd Floor	
3 rd Floor	
4 th Floor	

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage?

Y / N

b. Does the garage have a separate heating unit?

Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car)

Y / N / NA

Please specify

d. Has the building ever had a fire?

Y / N When?

e. Is a kerosene or unvented gas space heater present?

Y / N Where?

f. Is there a workshop or hobby/craft area?

Y / N Where & Type? Chlorine 260 gall drums

g. Is there smoking in the building?

Y / N How frequently?

 in adjoining bldg area

h. Have cleaning products been used recently?

Y / N When & Type?

i. Have cosmetic products been used recently?

Y / N When & Type?

- j. Has painting/staining been done in the last 6 months? Y ☒ N Where & When? _____
- k. Is there new carpet, drapes or other textiles? Y ☒ N Where & When? _____
- l. Have air fresheners been used recently? Y ☒ N When & Type? _____
- m. Is there a kitchen exhaust fan? Y ☒ N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? Y ☒ N If yes, where vented? _____
- o. Is there a clothes dryer? Y ☒ N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y ☒ N When & Type? _____

Are there odors in the building?

Y ☒ N

If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? generator room in bldg. w/ oil smell

If yes, are their clothes washed at work?

Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

Yes, use dry-cleaning infrequently (monthly or less)

Yes, work at a dry-cleaning service

No

Unknown

NA

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: ☒ Public Water ☐ Drilled Well ☐ Driven Well ☐ Dug Well Other: _____

Sewage Disposal: ☐ Public Sewer ☐ Septic Tank ☐ Leach Field ☐ Dry Well Other: NA

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

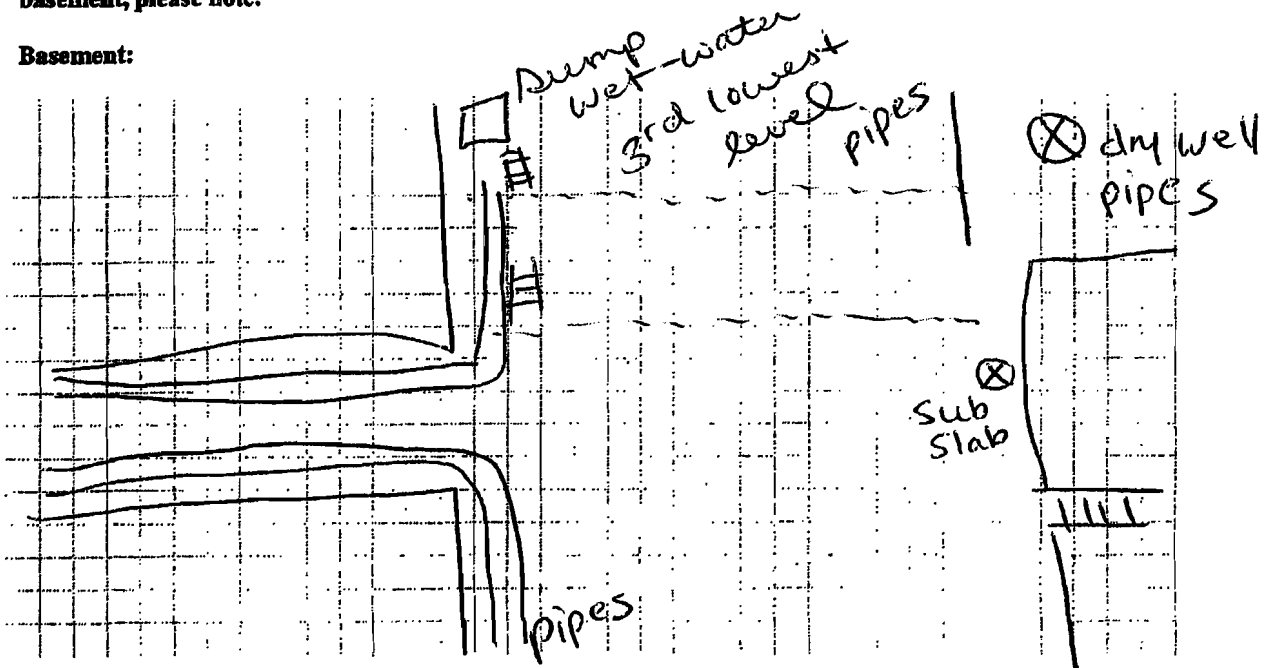
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

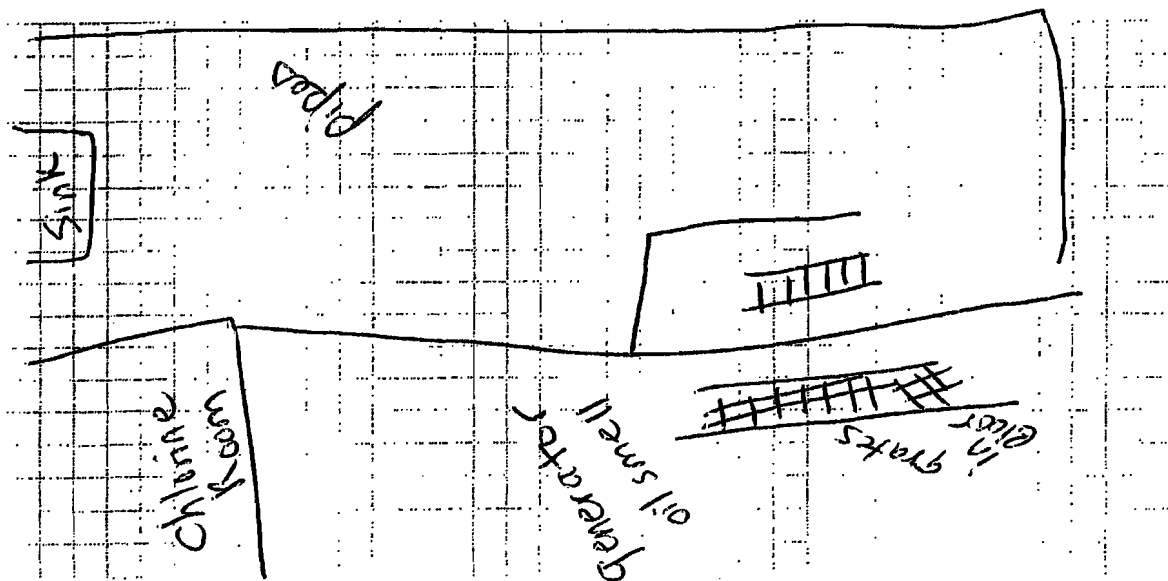
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



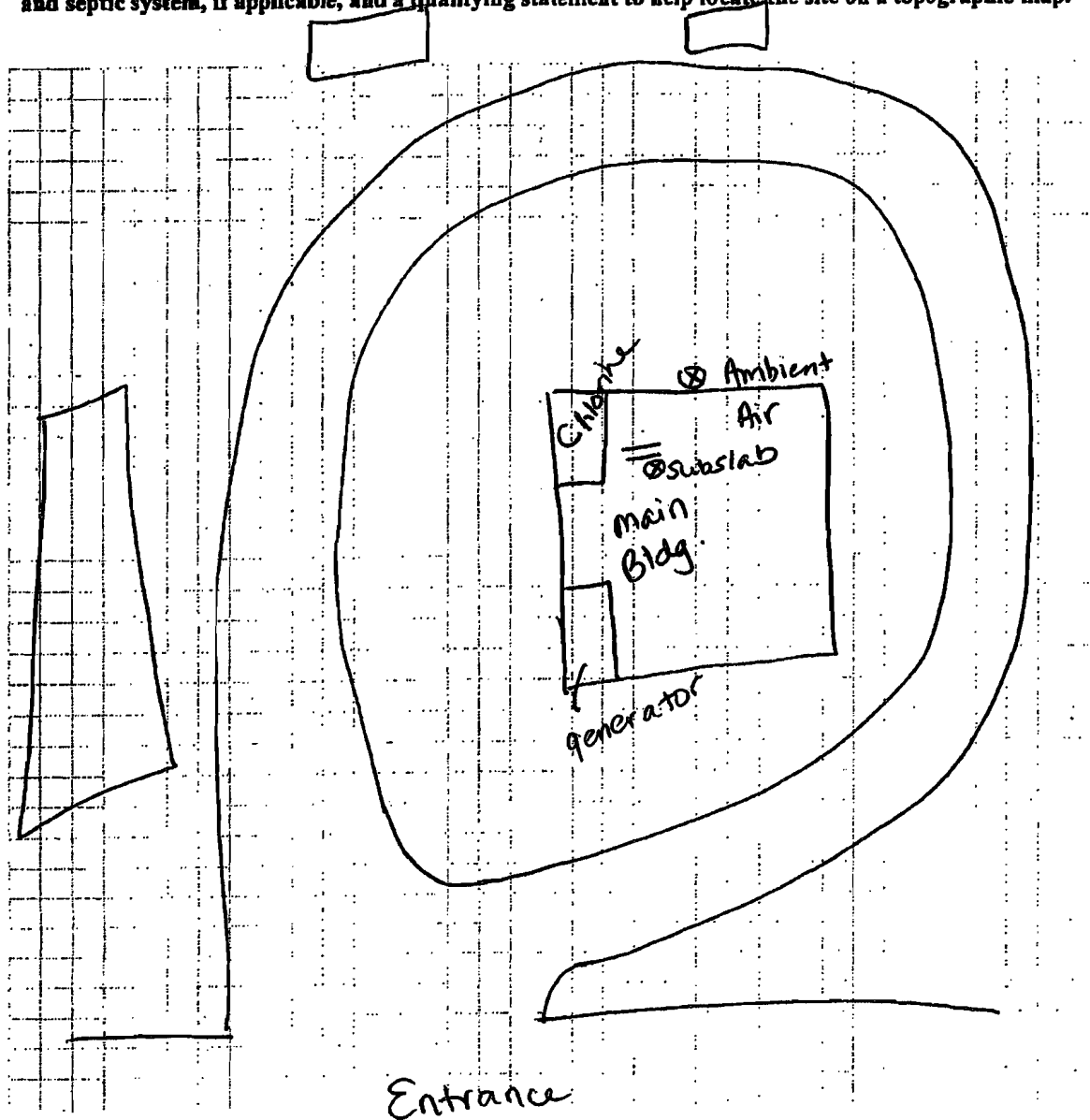
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** <u>Y/N</u>
	55 gallon drum with chlorine stored on first floor - smell chlorine					
	In generator room smelled like oil, oil tank is located outside of the facility.					

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

**NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant _____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

R14

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	<u>Colonia</u>
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other: _____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors 4

Building age 1950's

Is the building insulated? Y / N

How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with tile 90%
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y/N
- k. Water in sump? Y N not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

opening in block along wall - see plot

sump (dry)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply - note primary)

<u>Hot air circulation</u>	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler
		Other _____

The primary type of fuel used is:

Natural Gas	<u>Fuel Oil</u>	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y/N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement	<u>laundry / storage going to finish</u>
1 st Floor	<u>living room / dining room / kitchen</u>
2 nd Floor	<u>3rd bed 2 bath</u> ↗
3 rd Floor	<u>Den</u> ↖
4 th Floor	<u></u>

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- Is there an attached garage? ☒ Y ☐ N
- Does the garage have a separate heating unit? Y ☒ N / NA
- Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) ☒ Y ☐ N / NA
Please specify _____
- Has the building ever had a fire? Y ☒ N When? _____
- Is a kerosene or unvented gas space heater present? Y ☒ N Where? _____
- Is there a workshop or hobby/craft area? Y ☒ N Where & Type? _____
- Is there smoking in the building? Y ☒ N How frequently? _____
- Have cleaning products been used recently? ☒ Y ☐ N When & Type? _____
- Have cosmetic products been used recently? ☒ Y ☐ N When & Type? _____

j. Has painting/staining been done in the last 6 months? ☒ Y ☐ N Where & When? _____

k. Is there new carpet, drapes or other textiles? ☒ Y ☐ N Where & When? _____

l. Have air fresheners been used recently? ☒ Y ☐ N When & Type? _____

m. Is there a kitchen exhaust fan? ☒ Y ☐ N If yes, where vented? _____

n. Is there a bathroom exhaust fan? ☒ Y ☐ N If yes, where vented? _____

o. Is there a clothes dryer? ☒ Y ☐ N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? ☒ Y ☐ N When & Type? _____

Are there odors in the building?

☒ Y ☐ N

If yes, please describe: _____

Do any of the building occupants use solvents at work?

☒ Y ☐ N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work?

☒ Y ☐ N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

Yes, use dry-cleaning infrequently (monthly or less)

Yes, work at a dry-cleaning service

☒ No

Unknown

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: ☒ Public Water Drilled Well Driven Well Dug Well Other: _____

Sewage Disposal: ☒ Public Sewer Septic Tank Leach Field Dry Well Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

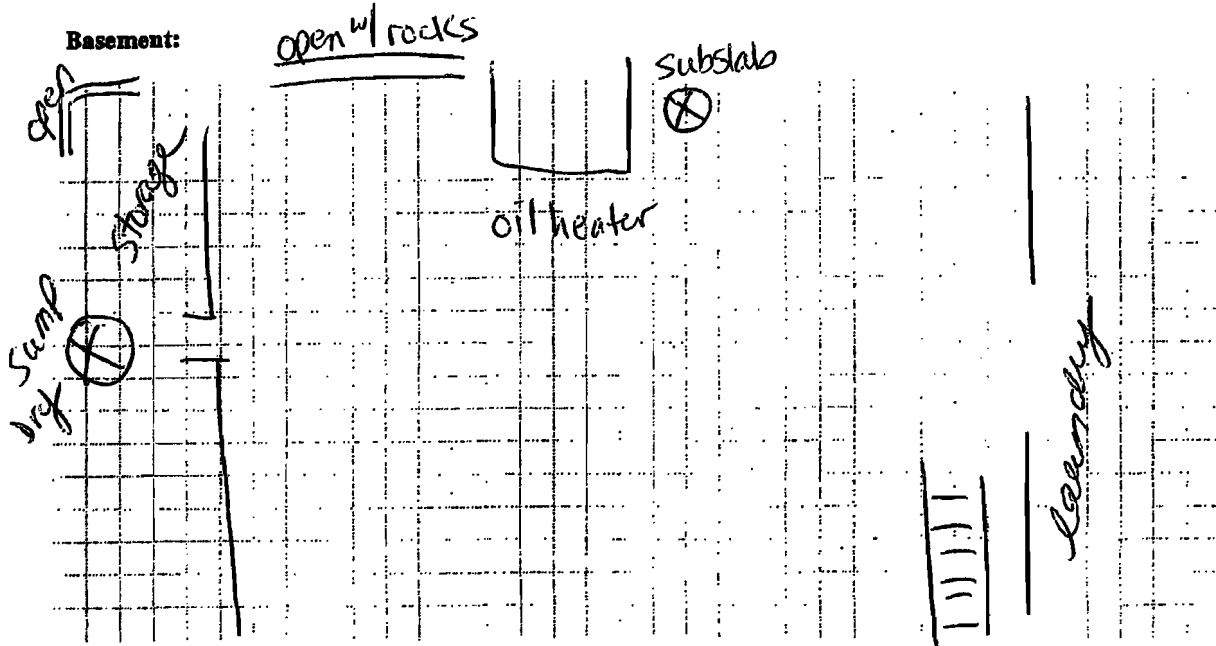
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

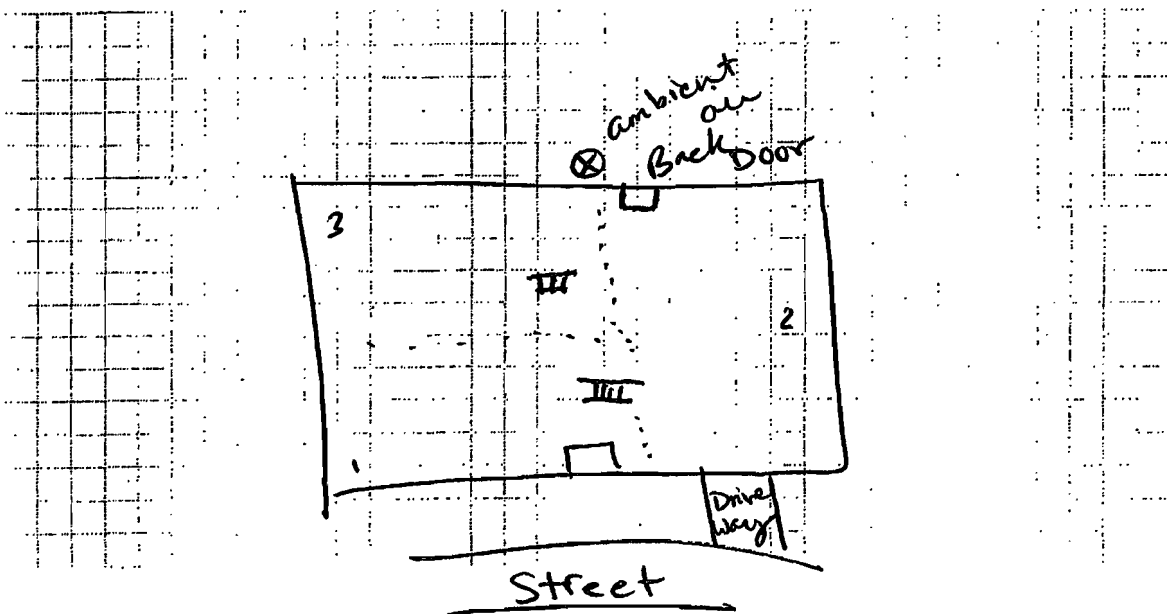
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



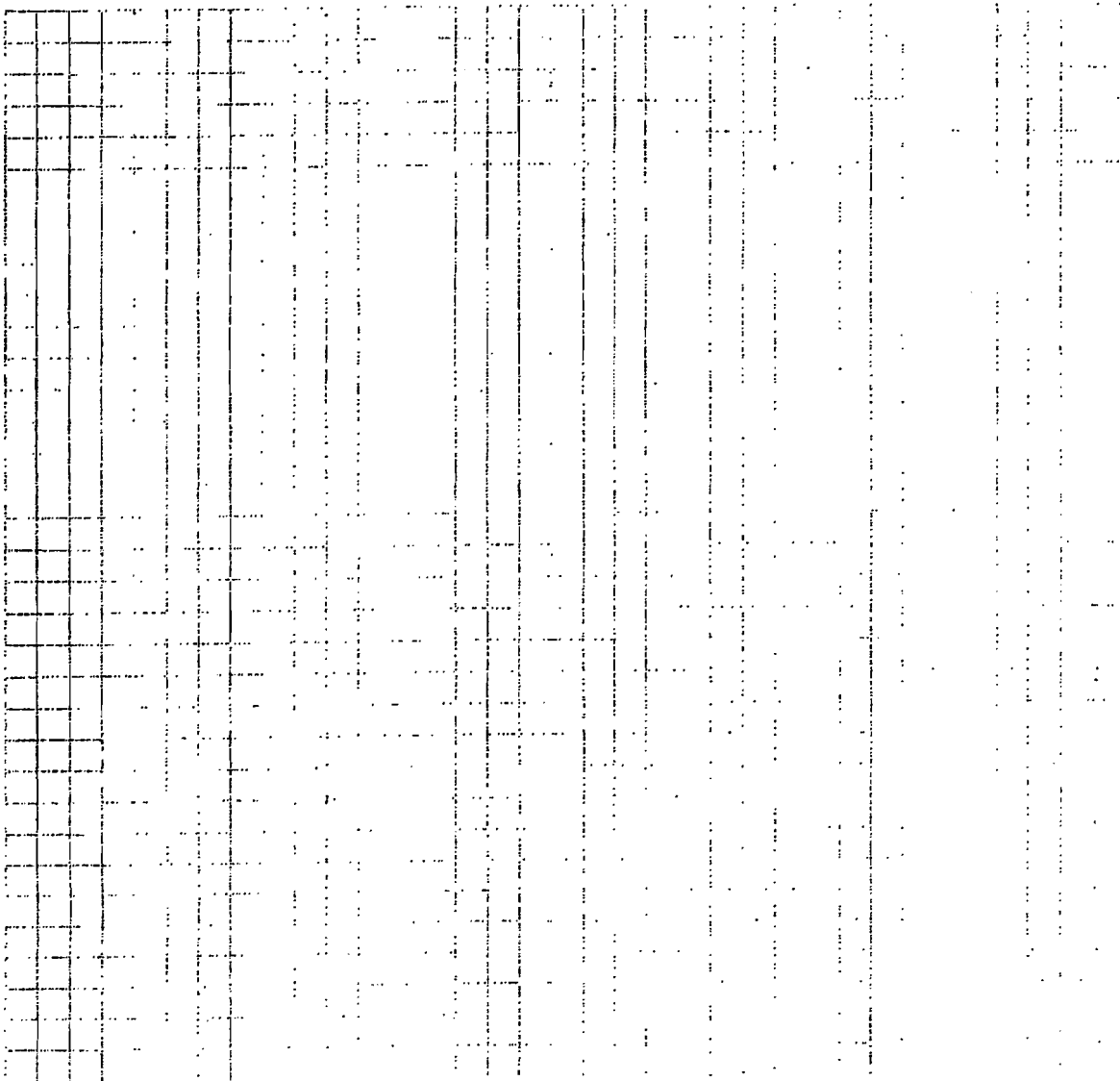
First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** <u>Y/N</u>
	Waterproofing wood					
	Latex paint					
	wood finish					
	primer (dealer)					
	wood dough					
	wall paper stripper					
	Crayola paint					
	thin-set mortar					
	bleach					
	laundry detergent					
	softener					
	Silicon spray lubricant					

* Describe the condition of the product containers as Unopened (UO), Used (U), or Deteriorated (D)

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

APPENDIX D
FIELD INVESTIGATION LOGBOOK



6 3/3/09 New Cassel Residential (mb)
Soil Vapor

830 Mel Kobert (mk) and Pat Connelly (PC) - CDM onsite - mobilizing, health & safety, calibrate multiRae: O₂: 20.9 CO: 48 ppm CH₄: 0.6 ppm H₂S: 25 ppm isobutylene: 100 ppm SW meter: 07406 Fine 5 gas lot # 008738 11/17/09 expiration isobutylene: 100 ppm lot # 829401D Expiration Oct 20, 2010 - PASS mk
900 Crew arrive at [2570 Aster Place] (R11)
Installed sub-slab port, collect 1A, 8B, AA samples. See log for canister & flow meter & ID #'s. VOC - 0.7 ppm
958 NCIA4-R11 #SB-030309 sub slab
958 NCIA4-R11 #BA-030309 basement indoor air
1003 NCIA4-R11 AA-030309 ambient air
initial pressures see log - mk
Also completed NYSDOH survey
1012 Crew leaves R11 - mk
to go get batteries for camera
1042 Crew at [2536 Aster Place] (R7)
1122 NCIA4-R7 SB-030309
NCIA4-R7 BA-030309
1127 NCIA4-R7 AA-030309
See log for canister / flow # VOC 13 ppm
- Muehl 3309

3/3/09 New Cassel Residential (mb)
Soil Vapor

Also completed NYSDOH Questionnaire and took pictures - mk
1135 Crew drove to govt facility on Iris Place. Water Dept owned. No one there at facility calling Water Dept (516) 794-8181 or 558-1900
Called and left information for the Commissioner and set up an appointment tomorrow for 8:15 am. Also called Patrick Pizo Director of Facilities of the school and left message with Sandy the Secretary - mk
1157 At [18 Barington St] Knocking and/or Made an appointment for 1300 on Thursday
1203 Resident does not speak english a friend was there who I explained the situation to, still resident wants someone who can speak english for [11 Dayton St] - mk
1209 At [9 Elton St.] talked to tenant and got landlord # 516-263-1879
Contact: Luis - mk
Called Luis and gave him info. on Sampling - Luis is going to call landlord and call me
- Muehl 3/3/09

New Canard Residential Soil Vapor

8 3/3/09

(MD)

1224 Went to 2583 Hyacinth St
dropped off letter - no one home
1233 Went to 226 Westbury - not home -
Nanny was home. Family gets home
@ 7pm. Going to come back this evening
1320 Crew at 35 Carelton Street R1
1412 NCIA4-R1 SB-030309
NCIA4-R1 BA-030309
1416 NCIA4-R1 AA-030309
See log for canister 1 Flow # 1000.7
VOC - 89.2 ppm - mel
1430 Talked to Sandy, got approval
for sampling at school. Talked to Dan
Head Custodian scheduled for next
week Wednesday / Thursday
1530 Crew will run errands, check
in hotel, check e-mail, call lab,
update residential schedule for PM.
1930 At 2516 Rose Place R8
1932 NCIA4-R8 SB-030309
NCIA4-R8 BA-030309 8:15
NCIA4-R8 AA-030309 8:15
19 Completed Hebert Questionnaire and took
N650H pictures

MD

3/3/09

New Canard Residential Soil Vapor

9 3/4/09

(MD)

930 Crew mobilizing - calibrating
MultiRae: see pg. 6 for SW# plot #
VOC (isobutylene): 100ppm LEL: 49ppm
H2S: 25ppm O2: 20.9 CO: 50ppm
1000 At R11 picking up canisters
1007 Closed SB & BA canisters VOC
7.6 ppm / See log for pressure readings
1020 Closed AA canister - mel
1030 Crew going to Staples for
sample packing material - VOC
1120 At R7 picking up canisters
1145 Went to 226 Westbury Drive
R3 to drop off letter. Gave to man
in house who claims he does not
live there - mel
Crew packing samples, checking
e-mails, and lunch - mel
1415 Went to R1 pick up canisters
see log for pressure readings r info.
1420 Closed SB/BA canisters VOC -
1430 Closed AA canister
1500 Mel Liberte office. Pat Connelly
staying to collect canister at R8
© 1900 mel

3/4/09

MD

10 New Cansel Residential

Soil Vapor

MD

8/4/09

Reap: (mk)

1939 Collected 8B & 8A Canisters at

[R.B.] 1948 Collected Aff. Dec 09

Sheet for pressures and equipment #s

Note: Could not get end VOC

reading since Mini Base lamp

was out - making to call pine

New Cansel Residential

Soil Vapor

MD

11

8/5/09

810 Crew met in hotel parking

lot - mobilizing - Calibrate miniRae's

H₂S: 24 ppm CO: 49 ppm O₂: 20.9

LEL: 49 ppm VOC (3000 ppm)

pg. 6 for SN & Lot # - fuel

830 At 2684 Hyacinth [R14]

923 NCIA4-R14SB - 030809

NCIA4-R14BA - 030809

926 NCIA4-R14AA - 030509

See log for canister / flow # + pressure

VOC reading was 110 ppm. Residence

had sump (dry) and open areas along

well see NYSDOH questionnaire

940 Crew heads to Fuel Ex to drop off

canister samples and pickup more

180 Jody Lynn Neelan NYSDOH called

Andrew Umreiko [R16] not available

for today's appointment at 11 am. Not

available till after March 22nd.

1020 Crew going to B Barington St

to see if we can sample before 1300 since

our 1100 cancelled. - Don't have phone

number for 408 Barington - met

mol 3/5/09

New Caswell Residential (m)

Soil Vapor

1300 Resident at 8 Barrington not home going to have to wait till 1330 when Crew scheduled appointment
1300 Went to 8 Barrington. The woman's (person who answered door on Tuesday)
Son answered door and was not aware of appointment. I explained to him the situation. He went inside I came out said his brother told him it was already done - I explained it wasn't since I'm the only person doing the sampling. He said he would have to call back is brother - so I gave him the CM letter and told him to call me if he wanted to participate.
1330 Crew heading out.

~~med~~
3/5/09

New Caswell Residential (m)

Soil Vapor

830 Crew onsite - mobilizing -
calibrate mini-Rad. see pg. 6 for SN.
Lot #'s CO-49 H₂S-250 LEL-50
O₂-20.9 Isobutylene - 97.2 ppm
915 At [R14] picking up canisters
918 Collect AA canister - med
923 Collect SB & BA canisters
VOC - 357 ppm. See log for pressure numbers & canister / flow number
935 Crew to FedEx to ship samples and pickup canisters - med
1030 Crew offsite - no other appointments today due to two cancellations yesterday

~~med~~
3/6/09

New Cannel Residential

3/9/09

Soil Vapor

(20)

- 830 Crew onsite: MK & PC
 calibrating mini-Rae, see pg. 6
 SN & Lot #s. CO-49 UEL-50
 O₂-20.9 H₂S-250 Isotemp: 100 ppm
 1 - mobilizing for the day
 2 841 Heading over to 2571 Aster [R9]
 3 900 [R9] does not have basement - only
 a crawl space - opening in front of house -
 h all dirt - no slab - going to leave a
 - canister inside crawl space - take picture
 & also collect one outside crawl space
 w Residence is home for mental health
 g patients and/or halfway house
 c 1050 Head over to Iris Place Water
 1 Department Facility R
 of the Town of Hempstead
 waiting for personnel to open gate 11 facility
 - made an appointment last week
 1106 Called water department for access
 1122 Dpt of water personnel onsite - open facility
 Dave onsite. 1st drilled in smaller
 bldg. onsite - slab was too thick. Then
 drilled in large, main building - got through
 slab - installed port - collected duplicate

2010

New Cannel Residential

3/9/09

Soil Vapor

(20)

Strong chlorine odor and oil smell
 in generator room in building on
 main floor - see NYSDOH questionnaire
 1243 NCIA4-R12SB-030909
 Dup- NCIA4-R12SD-030909
 1245 NCIA4-R12BA-030909
 Dup NCIA4-R12BAD-030909
 1232 NCIA4-R12AA-030909
 Dup NCIA4-R12AAD-030909
 See log for pressure, canister,
 flow & details. VOC - 0.1 ppm
 1300 At 1093 Iris Place [R10]
 Note R9 canister samples.
 915 NCIA4-R9BA-030909 in crawl space
 NCIA4-R9AA-030909 outdoor
 Back to [R10] mul
 1335 NCIA4-R10BA-030909
 1342 NCIA4-R10AA-030909
 1335 NCIA4-R10SB-030909
 See log for pressure & canister flow &
 VOC reading after purge: 0.1 ppm
 1345 Crew leaving R10
 Crew reorganizing car, do inventory.
 go to Fed Ex, call job - mul
 1450 Crew off site 3/9/09

2010

16 New Cassel Residential (mtd)
3/10/09 Soil vapor sampling

830 Crew MK & PC onsite
mobilizing - calibrating mini/multi gas
pg. 6 for details: CO-50 H₂S-25
O₂-20.9 LEL-50 Isotemp-99.3m
915 Pickup AA & BA canisters at [R1]
crawl space. See log for pressure
readings / canister flow #. VOC inside
crawl space - 4.7 ppm - met
h 930 Crew has down time until pickup
up at 1215. Going to internet cafe to
check e-mail & reorganize
w 1145 Called Water Dept. to meet us at
g facility at ground noonish
g 1208 AF facility - Dave opened gate
l 1232 Pickup SB dup SB, BA and
dup BAD canisters End VOC 1.6 ppm
Ambient VOC was 2.1 ppm. Located
below generator room - oil odor
1232 Pickup AA and dup AAD canister
look at log for pressure, canister, & flow
numbers & readings - met
1320 At [R10] canister pickup
1335 Pickup SB & BA canisters
End VOC - 13.7 ppm

Atc
3/10/09

17 New Cassel Residential (mtd)
3/10/09 Soil Vapor

1342 Pickup AA canister
See log for pressure, canister /
flow # & readings
1345 Crew to FedEx to drop off
samples & pickup glow meters
1430 Crew leaving site

~~Atc
3/10/09~~

18 New Cassel Residential
3/11/09 Soil Vapor Sampling (mld)

800 Crew mlt & PC onsite - mobilizing
Calibrate PID / multi RAE - pg 6 for SN.
Lot 1 calibration info: CO-50 LEL-49
H₂S-24 O₂-20.9 Leaking - 10.3
828 Crew at WC W.T. Clark High School
at 740 Edgewood Drive. Joe Jones of
a NYDEC onsite as well. Going to office
to page the head custodian Dan.
h 900 Finished drilling [SB1] - in basement
under reading lab and rooms 210/211, 10⁰
208/209 in hallway. Rejoining hallways
w are cement with dirt - took pictures
a 915 Took inventory and pictures
c 925 Joe Jones NYDEC offsite
1100 Completing [SB2] - in basement under
JR. library and JR. office VOC - 44.4 ppm
Took pictures and inventory
10¹¹ At [SB3] drilling port adjacent to
exit doors outside hallway of ladies
locker room in basement VOC-D-O

Note: Joe Jones asked to look in O'Brien's
Gene's indoor air sampling report for hot spot
areas. The highest basement and 1st floor
hits were located in areas w/ sidewalk and

mld 3/11/09

New Cassel Residential
3/11/09 Soil Vapor Sampling (mld) 19

dirt - cannot collect subsurface here
Note: Ladies locker room smells of perfume
10⁴² At [SB3] setting up canisters &
pump three dead air volumes
10⁴³ NCIA4-WCSB3-031109 VOC-D.O
10⁴⁴ NCIA4-WCSB3-031109 ppm
see log for pressure / canister / flow #
11⁰⁰ At [SB2] setting up / pump VOC-O
11⁰⁵ NCIA4-WCSB2-031109
NCIA4-WCSB2A-031109
see log for pressure / canister / flow info
11¹⁰ At [SB3] setting up / pump VOC
11¹⁶ NCIA4-WCSB1-031109
NCIA4-WCSB1-031109
see log for pressure / canister / flow info
11²⁰ Setting up AA in courtyard
11²⁷ NCIA4-WCSB1-031109
see log for pressure / canister / flow info
11³⁰ Crew leaving school
1200 Crew offsite

mld 3/11/09

20 New Canal Rutherford
 3/12/09 Soil Vapor (me)
 1000 MK & PC onsite - mobilizing
 Calibrating minirae Ag. 6 for Calibration
 Lot # SN# CO-50 H₂S - 2.5
 LEL - 49 O₂ - 20.9 Isobutli. Span
 Error. Tried shutting instrument off to
 recalibrate. Still have span error unable
 to record end VC readings
 10⁴⁰ Grewat [MC]
 10⁵⁰ Collect [SB3] and [BA3] samples
 see log for pressure readings
 1107 Collect [SB2] and [BA2] samples
 see log for pressure readings
 1115 SB2 Box fitting w/ tubing. Cannot
 get out of port - needed to pull out
 part going to reinstall port when done
 Collecting samples
 1119 Collected [SB1] [BA1] samples
 see log for pressure readings
 1125 Put in new [SB2] port
 1136 Collected [BA] sample from
 Outyard see log for pressure
 1140 Packing up [WC]
 1200 Crawl leaving site to Edison
 Warehouse to demoto 3/12/09
 Mell

APPENDIX E
ANALYTICAL RESULTS SUMMARY TABLES



Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

			sys_sample_code:	NCIA4-R10AA-030909	NCIA4-R10BA-030909
			sample_date:	03/09/2009	03/09/2009
			sys_loc_code:	R10-AA	R10-BA
cas_m	chemical_name	result_unit			
71-55-6	1,1,1-Trichloroethane	µg/m3		0.73 U	16
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3		0.92 U	1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3		1 U	1.1 U
79-00-5	1,1,2-Trichloroethane	µg/m3		0.73 U	0.8 U
75-34-3	1,1-Dichloroethane	µg/m3		0.54 U	0.59 U
75-35-4	1,1-Dichloroethene	µg/m3		0.53 U	0.58 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3		5 U	5.4 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3		0.66 U	7.4
106-93-4	1,2-Dibromoethane	µg/m3		1 U	1.1 U
78-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3		0.94 U	1 U
95-50-1	1,2-Dichlorobenzene	µg/m3		0.8 U	0.88 U
107-06-2	1,2-Dichloroethane	µg/m3		0.54 U	0.59 U
78-87-5	1,2-Dichloropropane	µg/m3		0.62 U	0.67 U
106-67-8	1,3,5-Trimethylbenzene	µg/m3		0.66 U	1.8
106-99-0	1,3-Butadiene	µg/m3		0.3 U	0.32 U
541-73-1	1,3-Dichlorobenzene	µg/m3		0.8 U	0.88 U
106-46-7	1,4-Dichlorobenzene	µg/m3		0.8 U	0.88 U
123-91-1	1,4-Dioxane	µg/m3		0.48 U	0.53 U
540-84-1	2,2,4-Trimethylpentane	µg/m3		3.1 U	5.6
78-93-3	2-Butanone	µg/m3		4.1	2.1
591-78-6	2-Hexanone	µg/m3		2.7 U	3 U
67-63-0	2-Propanol	µg/m3		36	14
822-96-8	4-Ethyltoluene	µg/m3		0.66 U	6.4
108-10-1	4-Methyl-2-Pentanone	µg/m3		0.55 U	0.6 U
67-64-1	Acetone	µg/m3		31	45
107-05-1	Allyl Chloride	µg/m3		2.1 U	2.3 U
71-43-2	Benzene	µg/m3		0.82	6.2
100-44-7	Benzyl Chloride	µg/m3		0.69 U	0.76 U
75-27-4	Bromodichloromethane	µg/m3		0.9 U	0.96 U
75-25-2	Bromoform	µg/m3		1.4 U	1.5 U
74-83-9	Bromomethane	µg/m3		0.52 U	0.57 U
75-15-0	Carbon Disulfide	µg/m3		2.1 U	2.3 U
56-23-5	Carbon tetrachloride	µg/m3		0.84 U	0.92 U
106-90-7	Chlorobenzene	µg/m3		0.62 U	0.67 U
75-00-3	Chloroethane	µg/m3		0.35 U	0.38 U
67-66-3	Chloroform	µg/m3		0.65 U	1.3
74-87-3	Chloromethane	µg/m3		1.3	0.8
156-59-2	cis-1,2-Dichloroethene	µg/m3		0.53 U	0.58 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3		0.61 U	0.66 U
110-82-7	Cyclohexane	µg/m3		0.46 U	2.8
124-48-1	Dibromochloromethane	µg/m3		1.1 U	1.2 U
75-71-8	Dichlorodifluoromethane	µg/m3		1.9	1.8
64-17-5	Ethanol	µg/m3		120 EJ	150 EJ
100-41-4	Ethylbenzene	µg/m3		0.58 U	6.4
87-68-3	Hexachlorobutadiene	µg/m3		7.1 U	7.8 U
110-54-3	Hexane	µg/m3		0.76	20
98-82-8	Isopropylbenzene	µg/m3		0.66 U	0.72 U
179601-23-1	m,p-Xylene	µg/m3		0.95	24
1634-04-4	Methyl t-Butyl Ether	µg/m3		0.48 U	0.53 U
75-09-2	Methylene chloride	µg/m3		0.93 U	5.3
142-82-5	n-Heptane	µg/m3		0.55 U	5.9
103-65-1	N-Propylbenzene	µg/m3		0.66 U	1.4
95-47-6	o-Xylene	µg/m3		0.58 U	7.3
100-42-5	Styrene	µg/m3		0.57 U	0.62 U
127-18-4	Tetrachloroethene	µg/m3		0.91 U	0.99 U
109-99-9	Tetrahydrofuran	µg/m3		2 U	2.2 U
108-88-3	Toluene	µg/m3		2.4	57
156-60-5	trans-1,2-Dichloroethene	µg/m3		0.53 U	0.58 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3		0.61 U	0.66 U
79-01-6	Trichloroethene	µg/m3		0.14 U	0.16 U
75-69-4	Trichlorofluoromethane	µg/m3		1	1.6
75-01-4	Vinyl Chloride	µg/m3		0.39	0.37 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

			sys_sample_code: sample_date: sys_loc_code:	NCIA4-R10SB-030909 03/09/2009 R10-SB	NCIA4-R11AA-030309 03/03/2009 R11-AA	NCIA4-R11BA-030309 03/03/2009 R11-BA
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3		1.2 U	0.71 U	0.81 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3		1.5 U	0.89 U	1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3		1.7 U	1 U	1.1 U
79-00-5	1,1,2-Trichloroethane	µg/m3		1.2 U	0.71 U	0.81 U
75-34-3	1,1-Dichloroethane	µg/m3		0.88 U	0.53 U	0.6 U
75-35-4	1,1-Dichloroethene	µg/m3		0.86 U	0.52 U	0.59 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3		8 U	4.8 U	5.5 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3		1.1 U	2.6	2.8
106-93-4	1,2-Dibromoethane	µg/m3		1.7 U	1 U	1.1 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3		1.5 U	0.91 U	1 U
95-50-1	1,2-Dichlorobenzene	µg/m3		1.3 U	0.78 U	0.9 U
107-06-2	1,2-Dichloroethane	µg/m3		0.88 U	0.53 U	0.6 U
78-87-5	1,2-Dichloropropane	µg/m3		1 U	0.6 U	0.69 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3		1.1 U	0.72	0.78
106-99-0	1,3-Butadiene	µg/m3		0.48 U	0.29 U	0.62
541-73-1	1,3-Dichlorobenzene	µg/m3		1.3 U	1.6	0.9 U
106-46-7	1,4-Dichlorobenzene	µg/m3		1.3 U	1.2	0.9 U
123-91-1	1,4-Dioxane	µg/m3		0.78 U	0.47 U	0.54 U
540-84-1	2,2,4-Trimethylpentane	µg/m3		5.1 U	8.9	3.5 U
78-93-3	2-Butanone	µg/m3		2.6	4.4	2
591-78-6	2-Hexanone	µg/m3		4.4 U	2.7 U	3 U
67-63-0	2-Propanol	µg/m3		2.7 U	69	12
622-96-8	4-Ethyltoluene	µg/m3		1.1 U	2.4	2.4
108-10-1	4-Methyl-2-Pentanone	µg/m3		0.89 U	0.53 U	0.61 U
67-64-1	Acetone	µg/m3		12	31	35
107-05-1	Allyl Chloride	µg/m3		3.4 U	2 U	2.3 U
71-43-2	Benzene	µg/m3		0.69 U	2.5	2.1
100-44-7	Benzyl Chloride	µg/m3		1.1 U	0.67 U	0.77 U
75-27-4	Bromodichloromethane	µg/m3		1.4 U	0.87 U	1 U
75-25-2	Bromoform	µg/m3		2.2 U	1.3 U	1.5 U
74-83-9	Bromomethane	µg/m3		0.84 U	0.5 U	0.58 U
75-15-0	Carbon Disulfide	µg/m3		3.4 U	2 U	2.3 U
56-23-5	Carbon tetrachloride	µg/m3		1.4 U	0.82 U	0.94 U
108-90-7	Chlorobenzene	µg/m3		1 U	0.6 U	0.68 U
75-00-3	Chloroethane	µg/m3		0.57 U	0.34 U	0.39 U
67-66-3	Chloroform	µg/m3		1 U	0.63 U	0.73 U
74-87-3	Chloromethane	µg/m3		0.45 U	3	1.6
156-59-2	cis-1,2-Dichloroethene	µg/m3		0.86 U	0.52 U	0.59 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3		0.98 U	0.59 U	0.68 U
110-82-7	Cyclohexane	µg/m3		0.75 U	1	0.51 U
124-48-1	Dibromochloromethane	µg/m3		1.8 U	1.1 U	1.3 U
75-71-8	Dichlorodifluoromethane	µg/m3		1.9	1.9	2.1
64-17-5	Ethanol	µg/m3		6.2	140 EJ	280 EJ
100-41-4	Ethylbenzene	µg/m3		0.94 U	1.8	2
87-68-3	Hexachlorobutadiene	µg/m3		12 U	6.9 U	7.9 U
110-54-3	Hexane	µg/m3		0.76 U	5.1	2.2
98-82-8	Isopropylbenzene	µg/m3		1.1 U	0.64 U	0.73 U
179601-23-1	m,p-Xylene	µg/m3		0.94 U	6.7	6.8
1634-04-4	Methyl t-Butyl Ether	µg/m3		0.78 U	0.47 U	0.54 U
75-09-2	Methylene chloride	µg/m3		1.5 U	0.9 U	1 U
142-82-5	n-Heptane	µg/m3		0.89 U	2.2	4.2
103-65-1	N-Propylbenzene	µg/m3		1.1 U	0.64 U	0.73 U
95-47-6	o-Xylene	µg/m3		0.94 U	2.8	2.4
100-42-5	Styrene	µg/m3		0.92 U	0.55 U	0.63 U
127-18-4	Tetrachloroethene	µg/m3		4.3	0.88 U	1 U
109-99-9	Tetrahydrofuran	µg/m3		3.2 U	1.9 U	2.2 U
108-88-3	Toluene	µg/m3		0.93	10	15
156-60-5	trans-1,2-Dichloroethene	µg/m3		0.86 U	3.8	0.59 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3		0.98 U	0.59 U	0.68 U
79-01-6	Trichloroethene	µg/m3		0.23 U	0.14 U	0.17
75-69-4	Trichlorofluoromethane	µg/m3		1.4	0.9	1.2
75-01-4	Vinyl Chloride	µg/m3		0.55 U	0.33 U	0.38 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

			sys_sample_code:	NCIA4-R11SB-030309	NCIA4-R12AA-030909	NCIA4-R12AAD-030909
			sample_date:	03/03/2009	03/09/2009	03/09/2009
			sys_loc_code:	R11-SB	R12-AA	R12-AA
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3		0.75 U	0.76 U	0.78 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3		0.95 U	0.95 U	0.99 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3		1 U	1.1 U	1.1 U
79-00-5	1,1,2-Trichloroethane	µg/m3		0.75 U	0.76 U	0.78 U
75-34-3	1,1-Dichloroethane	µg/m3		0.58 U	0.56 U	0.58 U
75-35-4	1,1-Dichloroethene	µg/m3		0.55 U	0.55 U	0.57 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3		5.1 U	5.2 U	5.3 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3		1.8	0.68 U	1
106-93-4	1,2-Dibromoethane	µg/m3		1.1 U	1.1 U	1.1 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3		0.96 U	0.97 U	1 U
95-50-1	1,2-Dichlorobenzene	µg/m3		0.83 U	0.84 U	0.86 U
107-06-2	1,2-Dichloroethane	µg/m3		0.56 U	0.56 U	0.58 U
78-87-5	1,2-Dichloropropane	µg/m3		0.64 U	0.64 U	0.66 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3		0.68 U	0.68 U	0.71 U
106-99-0	1,3-Butadiene	µg/m3		0.3 U	0.31 U	0.32 U
541-73-1	1,3-Dichlorobenzene	µg/m3		0.83 U	0.84 U	0.86 U
106-46-7	1,4-Dichlorobenzene	µg/m3		1.2	0.84 U	0.86 U
123-91-1	1,4-Dioxane	µg/m3		0.5 U	0.5 U	0.52 U
540-84-1	2,2,4-Trimethylpentane	µg/m3		3.2 U	3.2 U	3.4 U
78-93-3	2-Butanone	µg/m3		1.6	2.9	1.9
591-78-6	2-Hexanone	µg/m3		2.8 U	2.8 U	2.9 U
67-63-0	2-Propanol	µg/m3		3	42	56
622-96-8	4-Ethyltoluene	µg/m3		1.1	0.68 U	0.79
108-10-1	4-Methyl-2-Pentanone	µg/m3		0.56 U	0.57 U	0.59 U
67-64-1	Acetone	µg/m3		20	24	15
107-05-1	Allyl Chloride	µg/m3		2.2 U	2.2 U	2.2 U
71-43-2	Benzene	µg/m3		0.5	0.69	0.64
100-44-7	Benzyl Chloride	µg/m3		0.71 U	0.72 U	0.74 U
75-27-4	Bromodichloromethane	µg/m3		0.92 U	0.93 U	0.96 U
75-25-2	Bromoform	µg/m3		1.4 U	1.4 U	1.5 U
74-83-9	Bromomethane	µg/m3		0.54 U	0.54 U	0.56 U
75-15-0	Carbon Disulfide	µg/m3		2.1 U	2.2 U	2.2 U
56-23-5	Carbon tetrachloride	µg/m3		0.87 U	0.87 U	0.91 U
108-90-7	Chlorobenzene	µg/m3		0.64 U	0.64 U	0.66 U
75-00-3	Chloroethane	µg/m3		0.36 U	0.37 U	0.38 U
67-66-3	Chloroform	µg/m3		1.1	0.96 U	0.73
74-87-3	Chloromethane	µg/m3		0.28 U	1.7	2
156-59-2	cis-1,2-Dichloroethene	µg/m3		0.55 U	0.55 U	0.57 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3		0.63 U	0.63 U	0.65 U
110-82-7	Cyclohexane	µg/m3		0.48 U	0.48 U	0.5 U
124-48-1	Dibromochloromethane	µg/m3		1.2 U	1.2 U	1.2 U
75-71-8	Dichlorodifluoromethane	µg/m3		1.6	1.9	2.1
64-17-5	Ethanol	µg/m3		14 J	120 EJ	130 EJ
100-41-4	Ethylbenzene	µg/m3		0.66	0.6 U	0.62 U
87-68-3	Hexachlorobutadiene	µg/m3		7.4 U	7.4 U	7.7 U
110-54-3	Hexane	µg/m3		0.52	0.57	0.51 U
98-82-8	Isopropylbenzene	µg/m3		0.68 U	0.68 U	0.71 U
179601-23-1	m,p-Xylene	µg/m3		2.3	0.79	1.1
1634-04-4	Methyl t-Butyl Ether	µg/m3		0.65	0.5 U	0.52 U
75-09-2	Methylene chloride	µg/m3		0.96 U	0.96 U	1 U
142-82-5	n-Heptane	µg/m3		0.56 U	0.57 U	0.59 U
103-65-1	N-Propylbenzene	µg/m3		0.68 U	0.68 U	0.71 U
95-47-6	o-Xylene	µg/m3		1.2	0.6 U	0.62 U
100-42-5	Styrene	µg/m3		0.59 U	0.59 U	0.61 U
127-18-4	Tetrachloroethene	µg/m3		6.5	0.94 U	0.98 U
109-99-9	Tetrahydrofuran	µg/m3		2 U	2 U	2.1 U
106-88-3	Toluene	µg/m3		110	2	3.7
156-60-5	trans-1,2-Dichloroethene	µg/m3		0.55 U	0.55 U	0.57 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3		0.63 U	0.63 U	0.65 U
79-01-6	Trichloroethene	µg/m3		0.36	0.15 U	0.15 U
75-69-4	Trichlorofluoromethane	µg/m3		1.7	1.1	1.1
75-01-4	Vinyl Chloride	µg/m3		0.35 U	0.36	0.37 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

sys_sample_code: sample_date: sys_loc_code:			NCIA4-R12BA-030909 03/09/2009 R12-BA	NCIA4-R12BAD-030909 03/09/2009 R12-BA	NCIA4-R12SB-030909 03/09/2009 R12-SB	NCIA4-R12SBD-030909 03/09/2009 R12-SB
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3	0.84 U	0.84 U	430 U	380 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	1.1 U	1.1 U	540 U	480 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	1.2 U	1.2 U	600 U	540 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.84 U	0.84 U	430 U	380 U
75-34-3	1,1-Dichloroethane	µg/m3	0.63 U	0.63 U	320 U	280 U
75-35-4	1,1-Dichloroethane	µg/m3	0.61 U	0.61 U	310 U	280 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	5.8 U	5.8 U	2300 U	2100 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	0.76 U	0.76 U	390 U	350 U
106-93-4	1,2-Dibromoethane	µg/m3	1.2 U	1.2 U	610 U	540 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	1.1 U	1.1 U	550 U	490 U
95-50-1	1,2-Dichlorobenzene	µg/m3	0.93 U	0.93 U	470 U	420 U
107-06-2	1,2-Dichloroethane	µg/m3	0.63 U	0.63 U	320 U	280 U
78-87-5	1,2-Dichloropropane	µg/m3	0.72 U	0.72 U	360 U	320 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.76 U	0.76 U	390 U	350 U
106-99-0	1,3-Butadiene	µg/m3	0.34 U	0.34 U	170 U	160 U
541-73-1	1,3-Dichlorobenzene	µg/m3	0.93 U	0.93 U	480 U	420 U
106-46-7	1,4-Dichlorobenzene	µg/m3	0.93 U	0.93 U	480 U	420 U
123-91-1	1,4-Dioxane	µg/m3	0.56 U	0.56 U	1100 U	1000 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3.6 U	3.6 U	370 U	330 U
78-93-3	2-Butanone	µg/m3	0.96 U	1.1 U	230 U	210 U
591-78-6	2-Hexanone	µg/m3	3.2 U	3.2 U	1300 U	1200 U
67-63-0	2-Propanol	µg/m3	1.9 U	1.9 U	780 U	690 U
622-96-8	4-Ethyltoluene	µg/m3	0.76 U	0.76 U	390 U	350 U
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.63 U	0.63 U	320 U	290 U
67-64-1	Acetone	µg/m3	8.6 U	10 U	750 U	670 U
107-05-1	Allyl Chloride	µg/m3	2.4 U	2.4 U	990 U	880 U
71-43-2	Benzene	µg/m3	1 U	1.3 U	250 U	220 U
100-44-7	Benzyl Chloride	µg/m3	0.8 U	0.8 U	410 U	360 U
75-27-4	Bromodichloromethane	µg/m3	1 U	1.1 U	530 U	470 U
75-25-2	Bromofrom	µg/m3	1.6 U	1.6 U	820 U	730 U
74-83-9	Bromomethane	µg/m3	0.6 U	0.6 U	310 U	270 U
75-15-0	Carbon Disulfide	µg/m3	2.4 U	2.4 U	250 U	220 U
56-23-5	Carbon tetrachloride	µg/m3	0.98 U	0.98 U	500 U	440 U
108-90-7	Chlorobenzene	µg/m3	0.71 U	0.71 U	360 U	320 U
75-00-3	Chloroethane	µg/m3	0.74 U	0.6 U	210 U	190 U
67-86-3	Chloroform	µg/m3	150 U	170 U	81000 U	80000 U
74-87-3	Chloromethane	µg/m3	1.2 U	1.6 U	650 U	580 U
156-59-2	cis-1,2-Dichloroethene	µg/m3	0.61 U	0.61 U	310 U	280 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.7 U	0.7 U	360 U	320 U
110-82-7	Cyclohexane	µg/m3	1.1 U	0.99 U	270 U	240 U
124-48-1	Dibromochloromethane	µg/m3	1.3 U	1.3 U	670 U	600 U
75-71-8	Dichlorodifluoromethane	µg/m3	1.9 U	2 U	390 U	350 U
64-17-5	Ethanol	µg/m3	7.5 U	9.4 U	600 U	530 U
100-41-4	Ethylbenzene	µg/m3	0.67 U	0.67 U	340 U	310 U
87-68-3	Hexachlorobutadiene	µg/m3	8.3 U	8.3 U	3400 U	3000 U
110-54-3	Hexane	µg/m3	1.4 U	1.5 U	280 U	250 U
98-82-8	Isopropylbenzene	µg/m3	0.76 U	0.76 U	390 U	350 U
179601-23-1	m,p-Xylene	µg/m3	1.6 U	1.8 U	340 U	310 U
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.56 U	0.56 U	280 U	250 U
75-09-2	Methylene chloride	µg/m3	1.1 U	1.1 U	270 U	240 U
142-82-5	n-Heptane	µg/m3	1.2 U	1.6 U	320 U	290 U
103-65-1	N-Propylbenzene	µg/m3	0.76 U	0.76 U	390 U	350 U
95-47-6	o-Xylene	µg/m3	0.67 U	0.71 U	340 U	310 U
100-42-5	Styrene	µg/m3	0.66 U	0.66 U	340 U	300 U
127-18-4	Tetrachloroethene	µg/m3	1 U	1 U	540 U	480 U
109-99-9	Tetrahydrofuran	µg/m3	2.3 U	2.3 U	230 U	210 U
108-88-3	Toluene	µg/m3	3.2 U	3.4 U	300 U	260 U
156-60-5	trans-1,2-Dichloroethene	µg/m3	0.61 U	0.61 U	310 U	280 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.7 U	0.7 U	360 U	320 U
79-01-6	Trichloroethene	µg/m3	0.23 U	0.24 U	420 U	380 U
75-69-4	Trichlorofluoromethane	µg/m3	1.1 U	1.2 U	440 U	400 U
75-01-4	Vinyl Chloride	µg/m3	0.4 U	0.4 U	200 U	180 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

sys_sample_code: sample_date: sys_loc_code:			NCIA4-R14AA-030509 03/05/2009 R14-AA	NCIA4-R14BA-030509 03/05/2009 R14-BA	NCIA4-R14SB-030509 03/05/2009 R14-SB	NCIA4-R1AA-030309 03/03/2009 R1-AA
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3	0.69 U	0.81 U	1.2 U	0.75 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	0.87 U	1 U	1.5 U	0.94 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	0.97 U	1.1 U	1.7 U	1 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.69 U	0.81 U	1.2 U	0.75 U
75-34-3	1,1-Dichloroethane	µg/m3	0.51 U	0.6 U	0.9 U	0.55 U
75-35-4	1,1-Dichloroethene	µg/m3	0.5 U	0.59 U	0.88 U	0.54 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	4.7 U	5.5 U	8.3 U	5.1 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	1.4	0.73 U	1.1 U	2.7
106-93-4	1,2-Dibromoethane	µg/m3	0.98 U	1.1 U	1.7 U	1 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	0.89 U	1 U	1.6 U	0.96 U
95-50-1	1,2-Dichlorobenzene	µg/m3	0.76 U	0.9 U	1.3 U	0.82 U
107-06-2	1,2-Dichloroethane	µg/m3	0.51 U	0.6 U	0.9 U	0.55 U
78-87-5	1,2-Dichloropropane	µg/m3	0.59 U	0.69 U	1 U	0.63 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.62 U	0.73 U	1.1 U	0.88
106-99-0	1,3-Butadiene	µg/m3	0.28 U	0.44	0.49 U	1.5
541-73-1	1,3-Dichlorobenzene	µg/m3	1.3	0.9 U	1.3 U	1.1
106-46-7	1,4-Dichlorobenzene	µg/m3	0.76 U	0.9 U	1.3 U	1.2
123-91-1	1,4-Dioxane	µg/m3	0.46 U	0.54 U	0.8 U	0.49 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3 U	3.5 U	5.2 U	15
78-93-3	2-Butanone	µg/m3	7	5	1.1	2.7
591-78-6	2-Hexanone	µg/m3	2.6 U	3 U	4.6 U	2.8 U
67-63-0	2-Propanol	µg/m3	110	10	2.7 U	67
622-96-8	4-Ethyltoluene	µg/m3	1.2	0.73 U	1.1 U	2.9
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.55	0.61 U	0.91 U	0.56 U
67-64-1	Acetone	µg/m3	51	22	6.4	20
107-05-1	Allyl Chloride	µg/m3	2 U	2.3 U	3.5 U	2.1 U
71-43-2	Benzene	µg/m3	1.7	1.3	0.71 U	4
100-44-7	Benzyl Chloride	µg/m3	0.66 U	0.77 U	1.2 U	0.71 U
75-27-4	Bromodichloromethane	µg/m3	0.85 U	1 U	1.5 U	0.92 U
75-25-2	Bromoform	µg/m3	1.3 U	1.5 U	2.3 U	1.4 U
74-83-9	Bromomethane	µg/m3	0.52	0.58 U	0.87 U	0.53 U
75-15-0	Carbon Disulfide	µg/m3	2 U	2.3 U	3.5 U	7.8
56-23-5	Carbon tetrachloride	µg/m3	0.8 U	0.94 U	1.4 U	0.86 U
108-90-7	Chlorobenzene	µg/m3	0.58 U	0.68 U	1 U	0.63 U
75-00-3	Chloroethane	µg/m3	0.36	0.39 U	0.59 U	0.36 U
67-66-3	Chloroform	µg/m3	0.62 U	0.73 U	85	0.67 U
74-87-3	Chloromethane	µg/m3	10	1.5	0.46 U	2
156-59-2	cis-1,2-Dichloroethene	µg/m3	0.5 U	0.59 U	0.88 U	0.54 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.58 U	0.68 U	1 U	0.62 U
110-82-7	Cyclohexane	µg/m3	0.44 U	0.51 U	0.77 U	2.9
124-48-1	Dibromochloromethane	µg/m3	1.1 U	1.3 U	1.9 U	1.2 U
75-71-8	Dichlorodifluoromethane	µg/m3	2.4	2.4	2.2	2
64-17-5	Ethanol	µg/m3	210 E	71	3.1 J	120 EJ
100-41-4	Ethylbenzene	µg/m3	0.7	0.65 U	0.97 U	2.1
87-68-3	Hexachlorobutadiene	µg/m3	6.8 U	7.9 U	12 U	7.3 U
110-54-3	Hexane	µg/m3	1.3	1.4	0.78 U	8.2
98-82-8	Isopropylbenzene	µg/m3	0.62 U	0.73 U	1.1 U	0.67 J
179601-23-1	m,p-Xylene	µg/m3	2.2	0.92	0.97 U	8.6
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.46 U	0.54 U	0.8 U	0.49 U
75-09-2	Methylene chloride	µg/m3	0.88 U	1 U	1.5 U	0.97
142-82-5	n-Heptane	µg/m3	0.78	0.95	0.91 U	4.9
103-65-1	N-Propylbenzene	µg/m3	0.62 U	0.73 U	1.1 U	0.8
95-47-6	o-Xylene	µg/m3	0.99	0.65 U	0.97 U	3
100-42-5	Styrene	µg/m3	0.54 U	0.63 U	0.95 U	0.58 U
127-18-4	Tetrachloroethene	µg/m3	0.86 U	1 U	1.5 U	0.93 U
109-99-9	Tetrahydrofuran	µg/m3	1.9 U	2.2 U	3.3 U	2 U
108-88-3	Toluene	µg/m3	3.3	6.8	1.4	12
156-60-5	trans-1,2-Dichloroethene	µg/m3	0.5 U	0.59 U	0.88 U	2
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.58 U	0.68 U	1 U	0.62 U
79-01-6	Trichloroethene	µg/m3	0.14 U	0.16 U	0.24 U	0.15 U
75-69-4	Trichlorofluoromethane	µg/m3	1.4	1.4	1.5	0.95
75-01-4	Vinyl Chloride	µg/m3	0.32 U	0.38 U	0.57 U	0.35 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

sys_sample_code: sample_date: sys_loc_code:			NCA4-R1BA-030309 03/03/2009 R1-BA	NCA4-R1SB-030309 03/03/2009 R1-SB	NCA4-R7AA-030309 03/03/2009 R7-AA	NCA4-R7BA-030309 03/03/2009 R7-BA
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3	0.71 U	0.87 U	0.66 U	0.78 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	0.9 U	1.1 U	0.84 U	0.99 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	1 U	1.2 U	0.94 U	1.1 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.71 U	0.87 U	0.66 U	0.78 U
75-34-3	1,1-Dichloroethane	µg/m3	0.53 U	0.65 U	0.49 U	0.58 U
75-35-4	1,1-Dichloroethene	µg/m3	0.52 U	0.63 U	0.48 U	0.57 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	25	5.9 U	4.5 U	5.3 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	2.3	2.1	0.6 U	0.71 U
106-93-4	1,2-Dibromoethane	µg/m3	1 U	1.2 U	0.94 U	1.1 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	0.92 U	1.1 U	0.85 U	1 U
95-50-1	1,2-Dichlorobenzene	µg/m3	38	0.96 U	0.73 U	0.86 U
107-06-2	1,2-Dichloroethane	µg/m3	0.53 U	0.65 U	0.49 U	0.58 U
78-87-5	1,2-Dichloropropane	µg/m3	0.6 U	0.74 U	0.56 U	0.66 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.83	0.93	0.6 U	0.71 U
106-99-0	1,3-Butadiene	µg/m3	0.44	0.43	0.27 U	0.32 U
541-73-1	1,3-Dichlorobenzene	µg/m3	0.79 U	0.96 U	0.73 U	0.86 U
106-46-7	1,4-Dichlorobenzene	µg/m3	0.79 U	0.96 U	0.73 U	0.86 U
123-91-1	1,4-Dioxane	µg/m3	0.47 U	0.58 U	0.44 U	0.52 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3 U	3.7 U	9.5	3.4 U
78-93-3	2-Butanone	µg/m3	1.2	17	2.2	2.7
591-78-6	2-Hexanone	µg/m3	2.7 U	3.3 U	2.5 U	2.9 U
67-63-0	2-Propanol	µg/m3	4.2	7.1	41	2.1
622-96-8	4-Ethyltoluene	µg/m3	2.9	2.9	0.67	0.71 U
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.54 U	0.66 U	0.5 U	0.59 U
67-64-1	Acetone	µg/m3	12	68	25	14
107-05-1	Allyl Chloride	µg/m3	2 U	2.5 U	1.9 U	2.2 U
71-43-2	Benzene	µg/m3	1.2	1.5	2.4	1.4
100-44-7	Benzyl Chloride	µg/m3	0.68 U	0.83 U	0.63 U	0.74 U
75-27-4	Bromodichloromethane	µg/m3	0.88 U	1.1 U	0.82 U	0.96 U
75-25-2	Bromoform	µg/m3	1.4 U	1.6 U	1.3 U	1.5 U
74-83-9	Bromomethane	µg/m3	0.51 U	0.62 U	0.47 U	0.56 U
75-15-0	Carbon Disulfide	µg/m3	2 U	2.5 U	1.9 U	2.2 U
56-23-5	Carbon tetrachloride	µg/m3	0.82 U	1 U	0.77 U	0.91 U
108-90-7	Chlorobenzene	µg/m3	0.6 U	0.74 U	0.56 U	0.66 U
75-00-3	Chloroethane	µg/m3	0.34 U	0.42 U	0.32 U	0.38 U
67-66-3	Chloroform	µg/m3	0.64 U	0.78 U	0.6 U	0.7 U
74-87-3	Chloromethane	µg/m3	1	0.9	2	1
156-59-2	cis-1,2-Dichloroethene	µg/m3	0.52 U	0.63 U	0.48 U	0.57 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.59 U	0.73 U	0.55 U	0.65 U
110-82-7	Cyclohexane	µg/m3	0.45 U	0.55 U	1	0.5 U
124-48-1	Dibromochloromethane	µg/m3	1.1 U	1.4 U	1 U	1.2 U
75-71-8	Dichlorodifluoromethane	µg/m3	2.1	2	2	2.2
64-17-5	Ethanol	µg/m3	62 J	78 J	88 J	53 J
100-41-4	Ethylbenzene	µg/m3	4.9	0.74	1.1	0.79
87-68-3	Hexachlorobutadiene	µg/m3	7 U	8.5 U	6.5 U	7.7 U
110-54-3	Hexane	µg/m3	0.84	1	4.9	2.1
98-82-8	Isopropylbenzene	µg/m3	0.64 U	0.79 U	0.6 U	0.71 U
179601-23-1	m,p-Xylene	µg/m3	21	2	3.5	2.5
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.47 U	0.58 U	0.44 U	0.52 U
75-09-2	Methylene chloride	µg/m3	1.9	2	0.85 U	3.5
142-82-5	n-Heptane	µg/m3	0.54 U	1.1	2	1.1
103-65-1	N-Propylbenzene	µg/m3	0.64 U	0.79 U	0.6 U	0.71 U
95-47-6	o-Xylene	µg/m3	5.6	1	1.2	0.77
100-42-5	Styrene	µg/m3	0.56 U	0.68 U	0.52 U	0.61 U
127-18-4	Tetrachloroethene	µg/m3	1.5	1.1 U	0.83 U	0.98 U
109-99-9	Tetrahydrofuran	µg/m3	1.9 U	2.4 U	1.8 U	2.1 U
108-88-3	Toluene	µg/m3	4	4.3	8.3	7.9
156-60-5	trans-1,2-Dichloroethene	µg/m3	0.52 U	0.63 U	3.7	0.57 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.59 U	0.73 U	0.55 U	0.65 U
79-01-6	Trichloroethene	µg/m3	2.1	0.17 U	0.13 U	0.4
75-69-4	Trichlorofluoromethane	µg/m3	1.3	1.3	0.78	1.4
75-01-4	Vinyl Chloride	µg/m3	0.33 U	0.41 U	0.31 U	0.37 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

sys_sample_code: sample_date: sys_loc_code:			NCIA4-R7SB-030309 03/03/2009 R7-SB	NCIA4-R8AA-030309 03/03/2009 R8-AA	NCIA4-R8BA-030309 03/03/2009 R8-BA
cas_n	chemical_name	result_unit			
71-55-6	1,1,1-Trichloroethane	µg/m3	1.1	0.72 U	0.87 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	0.94 U	0.91 U	1.1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	1 U	1 U	1.2 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.75 U	0.72 U	0.87 U
75-34-3	1,1-Dichloroethane	µg/m3	0.55 U	0.54 U	0.65 U
75-35-4	1,1-Dichloroethene	µg/m3	0.54 U	0.53 U	0.63 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	5.1 U	4.9 U	5.9 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	0.67 U	2.8	2
106-93-4	1,2-Dibromoethane	µg/m3	1 U	1 U	1.2 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	0.96 U	0.93 U	1.1 U
95-50-1	1,2-Dichlorobenzene	µg/m3	0.82 U	0.8 U	0.96 U
107-06-2	1,2-Dichloroethane	µg/m3	0.55 U	0.54 U	0.65 U
78-87-5	1,2-Dichloropropane	µg/m3	0.63 U	0.61 U	0.74 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.67 U	0.79	0.79 U
106-99-0	1,3-Butadiene	µg/m3	0.3 U	0.29 U	0.35 U
541-73-1	1,3-Dichlorobenzene	µg/m3	0.82 U	1.6	0.96 U
106-46-7	1,4-Dichlorobenzene	µg/m3	0.82 U	1.3	0.96 U
123-91-1	1,4-Dioxane	µg/m3	0.49 U	0.48 U	0.58 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3.2 U	6.8	3.7 U
78-93-3	2-Butanone	µg/m3	1.8	2.2	7.5
591-78-6	2-Hexanone	µg/m3	2.8 U	2.7 U	3.3 U
67-63-0	2-Propanol	µg/m3	1.7 U	86	10
622-96-8	4-Ethyltoluene	µg/m3	0.67 U	2.5	1.7
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.56 U	0.54 U	0.66 U
67-64-1	Acetone	µg/m3	7.8	17	21
107-05-1	Allyl Chloride	µg/m3	2.1 U	2.1 U	2.5 U
71-43-2	Benzene	µg/m3	0.44 U	1.6	1.6
100-44-7	Benzyl Chloride	µg/m3	0.71 U	0.69 U	0.83 U
75-27-4	Bromodichloromethane	µg/m3	0.92 U	0.89 U	1.1 U
75-25-2	Bromoform	µg/m3	1.4 U	1.4 U	1.6 U
74-83-9	Bromomethane	µg/m3	0.53 U	0.52 U	0.62 U
75-15-0	Carbon Disulfide	µg/m3	2.1 U	2.1 U	8
56-23-5	Carbon tetrachloride	µg/m3	0.86 U	0.84 U	1 U
108-90-7	Chlorobenzene	µg/m3	0.63 U	0.61 U	0.74 U
75-00-3	Chloroethane	µg/m3	0.36 U	0.35 U	0.42 U
67-66-3	Chloroform	µg/m3	23	0.65 U	0.78 U
74-87-3	Chloromethane	µg/m3	0.28 J	3.6	1
156-59-2	cis-1,2-Dichloroethene	µg/m3	14	0.53 U	0.63 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.62 U	0.6 U	0.73 U
110-82-7	Cyclohexane	µg/m3	0.47 U	0.85	1.2
124-48-1	Dibromochloromethane	µg/m3	1.2 U	1.1 U	1.4 U
75-71-8	Dichlorodifluoromethane	µg/m3	1.6	1.9	2.1
64-17-5	Ethanol	µg/m3	6.4 J	140 EJ	100 J
100-41-4	Ethylbenzene	µg/m3	0.59 U	1.7	1.5
87-68-3	Hexachlorobutadiene	µg/m3	7.3 U	7.1 U	8.5 U
110-54-3	Hexane	µg/m3	0.57	2.3	2.6
98-82-8	Isopropylbenzene	µg/m3	0.67 U	0.65 U	0.79 U
179601-23-1	m,p-Xylene	µg/m3	0.59 U	6.5	4.6
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.49 U	0.48 U	0.58 U
75-09-2	Methylene chloride	µg/m3	0.95 U	0.92 U	1.1 U
142-82-5	n-Heptane	µg/m3	0.56 U	1.6	1.6
103-65-1	N-Propylbenzene	µg/m3	0.67 U	0.65 U	0.79 U
95-47-6	o-Xylene	µg/m3	0.59 U	2.6	1.4
100-42-5	Styrene	µg/m3	0.58 U	0.57 U	0.68 U
127-18-4	Tetrachloroethene	µg/m3	2.2	0.9 U	1.1
109-99-9	Tetrahydrofuran	µg/m3	2 U	2 U	2.4 U
108-88-3	Toluene	µg/m3	24	8.7	5.4
156-60-5	trans-1,2-Dichloroethene	µg/m3	0.54 U	0.8	0.63 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.62 U	0.6 U	0.73 U
79-01-6	Trichloroethene	µg/m3	14	0.14 U	0.17 U
75-69-4	Trichlorofluoromethane	µg/m3	1.4	0.97	1.2
75-01-4	Vinyl Chloride	µg/m3	0.35 U	0.34 U	0.41 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

		sys_sample_code:	NCIA4-R8SB-030309	NCIA4-R9BA-030909	NCIA4-WCAA-031109
		sample_date:	03/03/2009	03/09/2009	03/11/2009
		sys_loc_code:	R8-SB	R9-BA	WC-AA
cas_m	chemical_name	result_unit			
71-55-6	1,1,1-Trichloroethane	µg/m3	2	0.86 U	0.78 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	1 U	1.1 U	0.99 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	1.2 U	1.2 U	1.1 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.83 U	0.86 U	0.78 U
75-34-3	1,1-Dichloroethane	µg/m3	0.62 U	0.64 U	0.58 U
75-35-4	1,1-Dichloroethene	µg/m3	0.6 U	0.63 U	0.57 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	5.6 U	5.9 U	5.3 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	0.75 U	0.78 U	0.71 U
106-93-4	1,2-Dibromoethane	µg/m3	1.2 U	1.2 U	1.1 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	1.1 U	1.1 U	1 U
95-50-1	1,2-Dichlorobenzene	µg/m3	0.91 U	0.95 U	0.86 U
107-06-2	1,2-Dichloroethane	µg/m3	0.62 U	0.64 U	0.58 U
78-87-5	1,2-Dichloropropane	µg/m3	0.7 U	0.73 U	0.66 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.75 U	0.78 U	0.71 U
106-99-0	1,3-Butadiene	µg/m3	0.34 U	0.35 U	0.32 U
541-73-1	1,3-Dichlorobenzene	µg/m3	0.91 U	0.95 U	0.86 U
106-46-7	1,4-Dichlorobenzene	µg/m3	0.91 U	0.95 U	0.86 U
123-91-1	1,4-Dioxane	µg/m3	0.55 U	0.57 U	0.52 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3.6 U	3.7 U	3.4 U
78-93-3	2-Butanone	µg/m3	2.3	1.2	3.1
591-78-6	2-Hexanone	µg/m3	3.1 U	3.2 U	2.9 U
67-63-0	2-Propanol	µg/m3	2.8	1.9 U	32
622-96-8	4-Ethyltoluene	µg/m3	0.75 U	0.78 U	0.71 U
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.62 U	0.65 U	0.59 U
67-64-1	Acetone	µg/m3	19	12	30
107-05-1	Allyl Chloride	µg/m3	2.4 U	2.5 U	2.2 U
71-43-2	Benzene	µg/m3	0.48 U	0.77	0.49
100-44-7	Benzyl Chloride	µg/m3	0.79 U	0.82 U	0.74 U
75-27-4	Bromodichloromethane	µg/m3	1 U	1 U	0.96 U
75-25-2	Bromoform	µg/m3	1.6 U	1.6 U	1.5 U
74-83-9	Bromomethane	µg/m3	0.59 U	0.61 U	0.56 U
75-15-0	Carbon Disulfide	µg/m3	2.4 U	2.5 U	2.2 U
56-23-5	Carbon tetrachloride	µg/m3	0.96 U	0.99 U	0.91 U
108-90-7	Chlorobenzene	µg/m3	0.7 U	0.73 U	0.66 U
75-00-3	Chloroethane	µg/m3	0.4 U	0.42 U	0.38 U
67-66-3	Chloroform	µg/m3	0.74 U	0.77 U	0.7 U
74-87-3	Chloromethane	µg/m3	0.31 U	0.82	1.2
156-59-2	cis-1,2-Dichloroethene	µg/m3	0.6 U	0.63 U	0.57 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.69 U	0.72 U	0.65 U
110-82-7	Cyclohexane	µg/m3	0.52 U	0.54 U	0.5 U
124-48-1	Dibromochloromethane	µg/m3	1.3 U	1.3 U	1.2 U
75-71-8	Dichlorodifluoromethane	µg/m3	1.4	2.1	2.2
64-17-5	Ethanol	µg/m3	5.2 J	5.2	170 E
100-41-4	Ethylbenzene	µg/m3	0.66 U	0.69 U	0.62 U
87-68-3	Hexachlorobutadiene	µg/m3	8.1 U	8.4 U	7.7 U
110-54-3	Hexane	µg/m3	0.54 U	0.56 U	0.71
98-82-8	Isopropylbenzene	µg/m3	0.75 U	0.78 U	0.71 U
179601-23-1	m,p-Xylene	µg/m3	0.66 U	0.87	1
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.55 U	0.57 U	0.52 U
75-09-2	Methylene chloride	µg/m3	1 U	1.1 U	1.2
142-82-5	n-Heptane	µg/m3	0.62 U	0.65 U	0.59 U
103-65-1	N-Propylbenzene	µg/m3	0.75 U	0.78 U	0.71 U
95-47-6	o-Xylene	µg/m3	0.66 U	0.69 U	0.62 U
100-42-5	Styrene	µg/m3	0.65 U	0.67 U	0.61 U
127-18-4	Tetrachloroethene	µg/m3	15	1.1 U	0.98 U
109-99-9	Tetrahydrofuran	µg/m3	2.2 U	2.3 U	2.1 U
108-88-3	Toluene	µg/m3	0.57 U	3.5	1.8
156-60-5	trans-1,2-Dichloroethene	µg/m3	0.6 U	0.63 U	0.57 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.69 U	0.72 U	0.65 U
79-01-6	Trichloroethene	µg/m3	0.16 U	0.17 U	0.15 U
75-69-4	Trichlorofluoromethane	µg/m3	1.4	1.1	1.2
75-01-4	Vinyl Chloride	µg/m3	0.39 U	0.4 U	0.76

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

sys_sample_code:			NCA4-WCBA1-031109	NCA4-WCBA2-031109	NCA4-WCBA3-031109
sample_date:			03/11/2009	03/11/2009	03/11/2009
sys_loc_code:			WC-BA1	WC-BA2	WC-BA3
cas_m	chemical_name	result_unit			
71-55-6	1,1,1-Trichloroethane	µg/m3	0.92 U	1.3	0.86 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3	1.2 U	1.3 U	1.1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3	1.3 U	1.4 U	1.2 U
79-00-5	1,1,2-Trichloroethane	µg/m3	0.92 U	1 U	0.86 U
75-34-3	1,1-Dichloroethane	µg/m3	0.68 U	0.76 U	0.64 U
75-35-4	1,1-Dichloroethene	µg/m3	0.67 U	0.74 U	0.63 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3	6.2 U	6.9 U	5.9 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3	0.82 U	0.92 U	0.78 U
106-93-4	1,2-Dibromoethane	µg/m3	1.3 U	1.4 U	1.2 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3	1.2 U	1.3 U	1.1 U
95-50-1	1,2-Dichlorobenzene	µg/m3	7.7	1.1 U	0.95 U
107-06-2	1,2-Dichloroethane	µg/m3	0.68 U	0.76 U	0.64 U
78-87-5	1,2-Dichloropropane	µg/m3	0.78 U	0.86 U	0.73 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3	0.82 U	0.92 U	0.78 U
106-99-0	1,3-Butadiene	µg/m3	0.37 U	0.41 U	0.35 U
541-73-1	1,3-Dichlorobenzene	µg/m3	1 U	1.1 U	0.95 U
106-46-7	1,4-Dichlorobenzene	µg/m3	1 U	1.1 U	0.95 U
123-91-1	1,4-Dioxane	µg/m3	0.6 U	0.67 U	0.57 U
540-84-1	2,2,4-Trimethylpentane	µg/m3	3.9 U	4.4 U	3.7 U
78-93-3	2-Butanone	µg/m3	14	5.4	1
591-78-6	2-Hexanone	µg/m3	3.4 U	3.8 U	3.2 U
67-63-0	2-Propanol	µg/m3	2.1 U	16	6.7
622-96-8	4-Ethyltoluene	µg/m3	0.82 U	0.92 U	0.78 U
108-10-1	4-Methyl-2-Pentanone	µg/m3	0.69 U	1.6	0.65 U
67-64-1	Acetone	µg/m3	15	28	10
107-05-1	Allyl Chloride	µg/m3	2.6 U	2.9 U	2.5 U
71-43-2	Benzene	µg/m3	1.2	0.76	0.65
100-44-7	Benzyl Chloride	µg/m3	0.87 U	0.97 U	0.82 U
75-27-4	Bromodichloromethane	µg/m3	1.1 U	1.2 U	1 U
75-25-2	Bromofom	µg/m3	1.7 U	1.9 U	1.6 U
74-83-9	Bromomethane	µg/m3	0.65 U	0.73 U	0.61 U
75-15-0	Carbon Disulfide	µg/m3	2.6 U	2.9 U	2.5 U
56-23-5	Carbon tetrachloride	µg/m3	1 U	1.2 U	0.99 U
108-90-7	Chlorobenzene	µg/m3	0.77 U	0.86 U	0.73 U
75-00-3	Chloroethane	µg/m3	0.44 U	0.49 U	0.42 U
67-66-3	Chlorofom	µg/m3	0.82 U	0.91 U	0.77 U
74-87-3	Chloromethane	µg/m3	0.97	0.84	1
156-59-2	cis-1,2-Dichloroethene	µg/m3	0.67 U	0.74 U	0.63 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3	0.78 U	0.85 U	0.72 U
110-82-7	Cyclohexane	µg/m3	1.6	0.64 U	0.54 U
124-48-1	Dibromochloromethane	µg/m3	1.4 U	1.6 U	1.3 U
75-71-8	Dichlorodifluoromethane	µg/m3	2.3	2.3	3.5
64-17-5	Ethanol	µg/m3	6.5 J	50 J	160 E
100-41-4	Ethylbenzene	µg/m3	1.3	0.81 U	0.69 U
87-68-3	Hexachlorobutadiene	µg/m3	9 U	10 U	8.4 U
110-54-3	Hexane	µg/m3	2	0.66 U	0.56 U
98-82-8	Isopropylbenzene	µg/m3	0.82 U	0.92 U	0.78 U
179601-23-1	m,p-Xylene	µg/m3	3.9	0.81 U	0.69 U
1634-04-4	Methyl t-Butyl Ether	µg/m3	0.6 U	0.67 U	0.57 U
75-09-2	Methylene chloride	µg/m3	14	1.7	1.1 U
142-82-5	n-Heptane	µg/m3	8.2	0.77 UJ	0.65 U
103-65-1	N-Propylbenzene	µg/m3	0.82 U	0.92 U	0.78 U
95-47-6	o-Xylene	µg/m3	1.2	0.81 U	0.69 U
100-42-5	Styrene	µg/m3	0.72 U	0.8 U	0.67 U
127-18-4	Tetrachloroethene	µg/m3	1.1 U	1.3 U	1.1 U
109-99-9	Tetrahydrofuran	µg/m3	2.5 U	2.8 U	2.3 U
108-88-3	Toluene	µg/m3	110	2.8	2.2
156-80-5	trans-1,2-Dichloroethene	µg/m3	0.67 U	0.74 U	0.63 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3	0.76 U	0.85 U	0.72 U
79-01-6	Trichloroethene	µg/m3	0.18 U	0.2 U	0.17 U
75-69-4	Trichlorofluoromethane	µg/m3	1.4	5.3	4.8
75-01-4	Vinyl Chloride	µg/m3	0.43 U	0.48 U	0.4 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

E - Tentatively identified

J - Estimated concentration

Appendix E
Soil Vapor Analytical Results
New Cassel Industrial Area Operable Unit 4
North Hempstead and Westbury, New York

			sys_sample_code:	NCA4-WCSB1-031109	NCA4-WCSB2-031109	NCA4-WCSB3-031109
			sample_date:	03/11/2009	03/11/2009	03/11/2009
			sys_loc_code:	WC-SB1	WC-SB2	WC-SB3
cas_m	chemical_name	result_unit				
71-55-6	1,1,1-Trichloroethane	µg/m3		0.93 U	1.1 U	0.84 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/m3		1.2 U	1.4 U	1.1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/m3		1.3 U	1.5 U	1.2 U
79-00-5	1,1,2-Trichloroethane	µg/m3		0.93 U	1.1 U	0.84 U
75-34-3	1,1-Dichloroethane	µg/m3		0.69 U	0.81 U	0.63 U
75-35-4	1,1-Dichloroethene	µg/m3		0.68 U	0.8 U	0.61 U
120-82-1	1,2,4-Trichlorobenzene	µg/m3		6.3 U	7.4 U	5.8 U
95-63-6	1,2,4-Trimethylbenzene	µg/m3		0.84 U	0.99 U	1.4 U
106-93-4	1,2-Dibromoethane	µg/m3		1.3 U	1.5 U	1.2 U
76-14-2	1,2-dichloro-1,1,2,2-tetrafluoroethane	µg/m3		1.2 U	1.4 U	1.1 U
95-50-1	1,2-Dichlorobenzene	µg/m3		15	1.2 U	0.93 U
107-06-2	1,2-Dichloroethane	µg/m3		0.69 U	0.81 U	0.63 U
78-87-5	1,2-Dichloropropane	µg/m3		0.79 U	0.93 U	0.72 U
108-67-8	1,3,5-Trimethylbenzene	µg/m3		0.84 U	0.99 U	0.76 U
106-99-0	1,3-Butadiene	µg/m3		0.38 U	0.44 U	0.34 U
541-73-1	1,3-Dichlorobenzene	µg/m3		1 U	1.2 U	0.93 U
106-46-7	1,4-Dichlorobenzene	µg/m3		1.1	1.2 U	0.93 U
123-91-1	1,4-Dioxane	µg/m3		0.62 U	0.72 U	0.56 U
540-84-1	2,2,4-Trimethylpentane	µg/m3		4 U	4.7 U	3.6 U
78-93-3	2-Butanone	µg/m3		1.1	0.98	1.2
591-78-6	2-Hexanone	µg/m3		3.5 U	4.1 U	3.2 U
67-63-0	2-Propanol	µg/m3		2.1 U	2.5 U	1.9 U
622-96-8	4-Ethyltoluene	µg/m3		0.84 U	0.99 U	1.2
108-10-1	4-Methyl-2-Pentanone	µg/m3		0.7 U	0.82 U	0.63 U
67-64-1	Acetone	µg/m3		8.7	5.5	12
107-05-1	Allyl Chloride	µg/m3		2.7 U	3.1 U	2.4 U
71-43-2	Benzene	µg/m3		0.55 U	0.64 U	2.2
100-44-7	Benzyl Chloride	µg/m3		0.88 U	1 U	0.8 U
75-27-4	Bromodichloromethane	µg/m3		1.1 U	1.3 U	1 U
75-25-2	Bromoform	µg/m3		1.8 U	2.1 U	1.6 U
74-83-9	Bromomethane	µg/m3		0.66 U	0.78 U	0.6 U
75-15-0	Carbon Disulfide	µg/m3		4.4	3.1 U	2.4 U
56-23-5	Carbon tetrachloride	µg/m3		1.1 U	1.3 U	0.98 U
108-90-7	Chlorobenzene	µg/m3		0.79 U	0.92 U	0.71 U
75-00-3	Chloroethane	µg/m3		0.45 U	0.53 U	0.51
67-66-3	Chloroform	µg/m3		5.3	2	0.76 U
74-87-3	Chloromethane	µg/m3		0.49	0.42 U	0.32 U
156-59-2	cis-1,2-Dichloroethene	µg/m3		0.68 U	0.8 U	0.61 U
10061-01-5	cis-1,3-Dichloropropene	µg/m3		0.78 U	0.91 U	0.7 U
110-82-7	Cyclohexane	µg/m3		0.59 U	0.69 U	0.53 U
124-48-1	Dibromochloromethane	µg/m3		1.4 U	1.7 U	1.3 U
75-71-8	Dichlorodifluoromethane	µg/m3		1.9	2.1	2
64-17-5	Ethanol	µg/m3		1.6 UJ	2.8 J	4.6
100-41-4	Ethylbenzene	µg/m3		0.74 U	0.87 U	0.84
87-68-3	Hexachlorobutadiene	µg/m3		9.1 U	11 U	8.3 U
110-54-3	Hexane	µg/m3		0.6 U	0.71 U	0.55 U
98-82-8	Isopropylbenzene	µg/m3		0.84 U	0.99 U	0.76 U
179601-23-1	m,p-Xylene	µg/m3		0.74 U	0.87 U	2.9
1634-04-4	Methyl t-Butyl Ether	µg/m3		0.62 U	0.72 U	0.56 U
75-09-2	Methylene chloride	µg/m3		1.2 U	1.4 U	1.1 U
142-82-5	n-Heptane	µg/m3		0.7 U	0.82 U	0.64 U
103-65-1	N-Propylbenzene	µg/m3		0.84 U	0.99 U	0.76 U
95-47-6	o-Xylene	µg/m3		0.74 U	0.87 U	0.85
100-42-5	Styrene	µg/m3		0.73 U	0.86 U	0.66 U
127-18-4	Tetrachloroethene	µg/m3		1.2 U	1.4 U	1.2
109-99-9	Tetrahydrofuran	µg/m3		2.5 U	3 U	2.3 U
108-88-3	Toluene	µg/m3		4.1	19	3.9
156-60-5	trans-1,2-Dichloroethene	µg/m3		0.68 U	0.8 U	0.61 U
10061-02-6	trans-1,3-Dichloropropene	µg/m3		0.78 U	0.91 U	0.7 U
79-01-6	Trichloroethene	µg/m3		0.18 U	0.22	0.31
75-69-4	Trichlorofluoromethane	µg/m3		1.7	1.9	1.7
75-01-4	Vinyl Chloride	µg/m3		0.44 U	0.51 U	0.4 U

Notes:

AA - Ambient air

BA - Basement

SB - Sub-slab

µg/m3 - micrograms per meter squared

U - Not detected

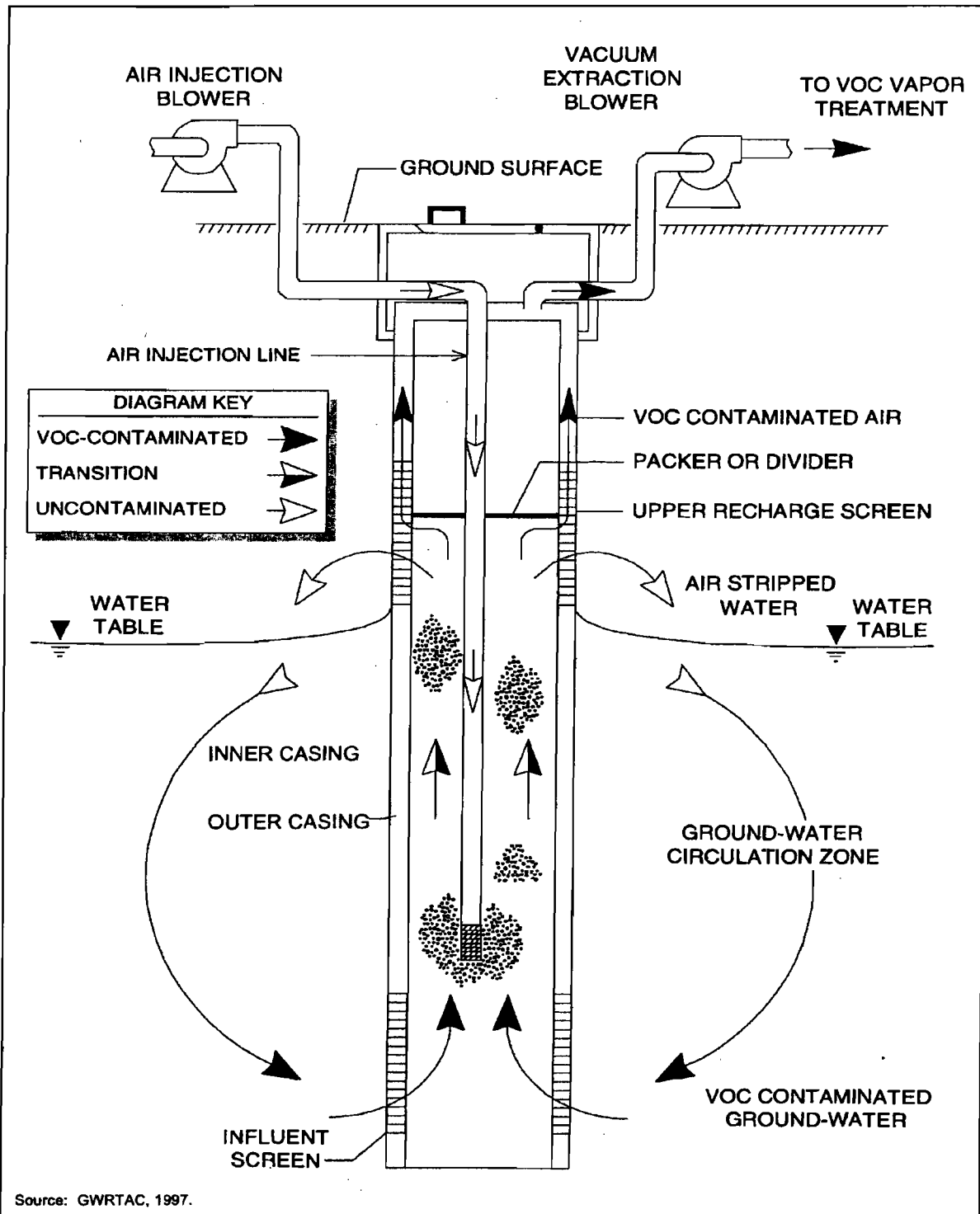
E - Tentatively identified

J - Estimated concentration

APPENDIX F

NYSDEC October 2003 ROD, In-Well Vapor Stripping Process Figure





In-Well Vapor Stripping Process

New Cassel Industrial Area

**Figure
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